

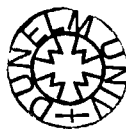
# **CORPORATE LEARNING AND RADICAL CHANGE: THE CASE OF KOREAN CHAEBOL**

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**Jong-Ho Lee**



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## List of abbreviations

R&D	Research and Development
LGE	LG Electronics Co.
SEC	Samsung Electronics Co.
OEM	Original Equipment Manufacturer
ICTs	Information & Communication Technologies
IT	Information Technology
CEO	Chief Executive Officer
CTO	Chief Technology Officer
EBO	Employees Buy-Out
PC	Personal Computer
IMF	International Monetary Fund
DAD	The Digital Appliance Business Division (LGE)
DDD	The Digital Display Business Division (LGE)
DMD	The Digital Multimedia Business Division (LGE)
PDP	Plasma Display Panel
LCD	Liquid Crystal Display
TFT-LCD	Thin-Film Transistor Liquid Crystal Display
VCR	Video Cassette Recorder
OBU	The Operating Business Unit (LGE)
TVCR	Television & Video Cassette Recorder
CRT	Cathode Ray Tube
LGIC	LG Information & Communication Co.
SMEs	Small and Medium-sized Enterprises
LGEIT	LG Electronics Institute of Technology (LGE)
CU	Culture Unit (LGE)
LGEIT	LG Electronics Institute of Technology
D-TVs	Digital Televisions
TNCs	Transnational Corporations
VSF	Vestigial Side Band

MBA	Master of Business Administration
DRAMs	Dynamic Random Access Memories
NVM	Non-Volatile Memory
ATTC	Advanced Technology Training Centre (SEC)
GMC	Global Marketing Research Centre (SEC)
LDC	Centre for Leadership Development (SEC)
GPM	Global Product Manager (SEC)
SAIT	Samsung Advanced Institute of Technology (SEC)
HQs	Headquarters
VIP Centre	Value Innovation Programme Centre (SEC)
IC	Integrated Circuits

## **Declaration**

No part of this thesis has previously been submitted for a degree at this or any other university.

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## **Abstract**

This thesis explores corporate responsiveness to radical change in the context of learning and adaptation. The empirical research is based on the experiences of large Korean companies. It is assumed that the Asian financial crisis has challenged their continuous survival, and the prime aim is to see whether restructuring has been learning centred. Thus, I am seeing whether chaebol act as latest theory would predict. The second aim is to examine the contextual variables, which are firm-specific as well as institutional environment-specific, that affect corporate learning and adaptation. It illustrates and criticises the powers of the evolutionary and institutional approach to the firm. This thesis makes four main contributions to the theorisation of learning and adaptation. First, it illustrates that learning alone cannot guarantee short-term as well as long-term adaptation of the firm. I argue that both learning and restructuring are necessary conditions for short-term as well as long-term adaptation of the firm. Second, it stresses that learning and adaptation are a product of a variety of variables within and without a firm. This is to stress the importance of institutional and firm-specific contexts that lead to the diversity and specificity of corporate adaptation and learning. Third, I argue that learning involves all forms of knowledge, including tacit and codified and that the interplay between incremental and radical learning is critical to understanding processes of learning-based adaptation. Finally, I argue that geographical proximity alone is not sufficient for understanding the nature of learning and that 'proximity' in learning should be studied along relational/organisational dimensions that go beyond geographical dimensions. These theoretical questions are examined through case studies of two of Korea's largest electronics companies: LG Electronics Company (LGE) and Samsung Electronics Company (SEC). This empirical study draws on the qualitative methodology centred on in-depth interviews and secondary sources.



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*To Hyun-Woo, my beloved wife, and our son*

# Chapter 1

## Introduction

It is clear that the chaebol need to act, both to survive the present crunch and, in the longer term, to attract the investment funds they need to grow. They must learn to run their companies in an entirely new way, abandoning empire building to focus on creating value for shareholders (Akaba, Budde and Choi, 1998).

This is but one example amongst a number of studies that evaluate the problem with Korea's giant conglomerates, the chaebol, and that suggest changes for survival since the financial crisis. In fact, the chaebol have already been exposed to increasing global competition led by rapid changes in market and technology. In these circumstances, the financial crisis has posed a great challenge to their survival. In the wake of the crisis, they have come under a great deal of political pressure from the government and non-governmental civic organisations, suggesting that the corporate sectors should be at the heart of structural reforms (see for example Kang, C. 1999; Kim, K. 1999; OECD, 2000; 2001). Despite their leading role in the nation's rapid economic growth and industrialisation, the chaebol have been blamed for Korea's financial crisis and their survival is at a crossroads.

The term chaebol refers to the Korea-specific business system, commonly business conglomerates owned and managed by founders and their families (Kang, M., 1996; Kang, C., 1999; Kim, E., 1989). The features of the typical chaebol include: 1) they are conglomerates of many companies; 2) they tend to spread across industries; 3) the major decisions associated with business strategy and investment tend to be made by the founders and their families. Although member firms (or affiliated firms) are listed as independent firms, they are linked by means of interlocking ownership or cross-shareholding. This ownership structure has made it easy for chaebol owners to control member firms by their hands despite their limited equity in member firms (Chung *et al.*,



1997). It illustrates that most of large private companies in Korea are associated with one of large conglomerates either directly or indirectly.

In general, scholars draw on two theoretical positions in order to understand the characteristics and evolution of large firms in Korea. The first is a political economy perspective, which places its interest on the role of the state in the evolution of chaebol and emphasises the symbiotic relationship between the state and chaebol (e.g. Kim, E. M., 1988, 1989). On the other hand, studies in strategic management and entrepreneurship tend to focus on the role of entrepreneurship and the firm's continuous efforts to acquire new technologies and knowledge (e.g. Hobday, 1995; Kim, I., 1997).

In modern Korean history, the emergence of the chaebol can be traced back to the early 1960s. The authoritarian regime that emerged through a military coup in 1961 found it necessary to gain legitimacy and the support of the people. The regime realised the urgent need for revitalising the nation's lagging economy and achieving rapid industrialisation. The First Five-Year Economic Development Plan was undertaken in 1962. The plan focused on the transformation of the nation's economy from labour-intensive light industries into more capital-intensive and technology-advanced industries, including chemicals, iron & steel, machinery, automobiles, shipbuilding and electronics. The political leaders believed that the solution to overcome the weakness of the nation's economic system, characterised by scarce natural resources and weak industrial foundations, would be to promote import-substitution, export-oriented industries. However, the government found it difficult to achieve such an ambitious development project in a short-term. It realised that there was a need to build cooperative relationships with existing entrepreneurs who ran large firms. Thanks to special favours and incentives provided by the government, the chaebol were able to rapidly grow by expanding their size as well as diversifying their business areas.

Above all, the government helped chaebol to acquire foreign loans with low interest rate and provided them with many other financial incentives to start new businesses,

especially in capital-intensive industries that the government intended to promote. The government played a catalytic role for chaebol to access and learn foreign technology, as they had no technical expertise, know-how and skills necessary to establish and run such new businesses. The government established public research institutes dedicated to technological development in key strategic industries such as electronics and machinery and the dissemination of more advanced technology and new knowledge in private firms. Take the example of Korean electronics firms. With the help of government support to promote technological and production capabilities of the domestic firms and the firms' own continuous efforts to learn and accumulate new knowledge, Korean electronics firms were able to establish organisational and technological capabilities to survive in market competition and compete for international markets.<sup>1</sup> According to Ernst (2000a: 5), Korean firm capabilities centred on three areas. First was the mastery of production capabilities for mass production beyond a simple assembly capability. Second, they acquired some related minor-change capabilities, ranging from "reverse engineering" to "analytical design" and some "system engineering" capabilities which involve the acquisition of the capabilities of process-reengineering and product customisation in limited areas. Third, they established the capacity to set up new production lines quickly and at low cost.

Utilising a carrot-and-stick strategy, the government forced firms to accelerate technological learning (Kim, L., 1997). If new entrants to technology-intensive industries displayed good performance, the government gave them additional financial loans or allowed them to embark on other new businesses. If not, they were not able to borrow additional loans as well as they did not have an industrial license to start new businesses. In addition, the government strictly regulated the imports of foreign products in technology-intensive sectors and controlled foreign direct investment, in order to promote the incubation of domestic firms. The business environment, characterised by a protected domestic market and guaranteed domestic demand, allowed chaebol to focus more on finding financial resources to invest into production facilities

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<sup>1</sup> For more details on technological learning by Korean firms in general and electronics firms in particular, see Hobday (1995) and Kim, L. (1997).

than on improving managerial skills and creating the market (Lee, K., 1999).

Under 'guided capitalism' where the state plays a guiding role in shaping and reshaping the national economy (Chang, 1994), a handful of chaebol came to dominate Korea's industrial landscape (Jung, S., 1997). The continuous expansion of scale economies provided a basis for them to successively diversify into a number of related or unrelated industries in a short period of time (Amsden, 1989). By 1986, the top ten chaebol accounted for more than 65 per cent of GNP and, in 1989, total sales of the top four chaebol account for around half the GNP (Kang, M. 1996).

Despite their remarkable role as drivers of rapid industrialisation in the Korean economy, chaebol have had a number of negative effects on the economy. As many commentators have pointed out, it is widely accepted that chaebol's mistaken management practices played a crucial role in bringing about the 1997 financial crisis (Chang *et al.*, 1998; Kang, C. K., 1999; Mathews, 1998). These management practices arose from owner-centric corporate governance strategies (see, for more details, Economic Studies Division at the Social Participation Alliance Group, 1999). Although, at the early stage of chaebol formation, entrepreneurial owners without doubt contributed to the rapid growth of their companies through inherent management capability, paternalistic management has been identified as a major cause of bad management practices. It has been argued that some of chaebol founders tend not only to show arbitrary leadership but also make reckless investments. They invested too excessively in already overcrowded industries, resulting in huge debts, in spite of a lack of core competences and expertise. To borrow bank loans and gain special favours, they made great efforts to manage political connections with the government officials and political leaders, under a regime of what might be called 'crony capitalism' (Chang *et al.*, 1998). Subsequently, reckless investments led to low efficiency, causing low profitability.

Nevertheless, it is also true that some chaebol, on the other side, have made great efforts

to be more competitive in international competition through continuous learning in technology and marketing. These firms have been able to continue to survive and some of them have become international players. Consequently, while many chaebol have failed to manage their businesses, others have become stronger and bigger. Amongst the top 10 chaebol in 1970s, only few have survived to date, including Samsung, LG (previously Lucky Goldstar), Hyundai and SK (previously Sun Kyung). These chaebol have something in common. Broadly speaking, it is said that they have responded more effectively to changes in the market environment. They have made greater effort to build up both technological and organisational capabilities of their own than others. Leading member firms of each chaebol are well known both domestically and internationally.

To sum up, corporate adaptation in the period of the national industrialisation was centred on keeping pace with the government's industrial policy and monopolising the domestic industries through economies of scale and diversification. This means of 'adaptation' has become increasingly obsolete since the late 1980s. First, overcompetition in the same industry between chaebol has resulted in the rapid saturation of the domestic market. Second, labour costs have rapidly increased since the great labour disputes occurred in the mid 1980s. Third, the protection of the domestic market has been increasingly deregulated. Fourth, international market competition has become unprecedentedly intense and technology has become more complex and unpredictable.

Above all, the financial crisis has provided large Korean firms with another great pressure to reform corporate governance and management practices. As OECD (2001) point out,

As explained in the past three OECD *Economic Survey of Korea*, fundamental weaknesses in these [corporate and financial] sectors made Korea vulnerable to contagion from other Asian countries in 1997 and, moreover, accounted for the severity of the crisis. In short, Korea's highly-leveraged companies were vulnerable

to the cyclical downturn and external shocks experienced in 1996 and 1997, which resulted in severe balance-sheet problems and a series of major bankruptcies (p. 127).

Although there have been a great deal of debate on the cause of the financial crisis, it has been agreed that the nature of the crisis should be found in chaebol's outdated management practices.

The problem is capacity. The top chaebol value size over profitability, diversification over specialization, and huge debt over a solid equity base (*Business Week*, 14 December 1998: p. 72).

[A shareholder activist said]: "The issue here is the power wielded by founding families"..... "Without tackling governance, you can't expect significant reforms at the chaebol" (*Business Week*, 24 April 2000: p. 66).

In this context, the government, as the developmental state, has been a central force in guiding and reshaping the paths of corporate adaptation. The government, on the basis of the guidance of the IMF, has initiated a corporate restructuring programme and such the state intervention has been central to the radical moves of chaebol towards improving management practices and governance structure.

This thesis would not attempt to unpack in detail the nature of the financial crisis or the government-led corporate reform processes as prime concerns, as it is beyond the focus of the thesis. However, in this thesis these issues will also be considered in the course of analysis. This is not only because this has critical implications for grasping the recent paths of adaptation by large Korean firms but also because the 1997 financial turmoil signifies that Korean firms can no longer secure their survival with their existing mode of adaptation. Whether or not they are able to sustain adaptation and evolution may rely on how they effectively restructure to adapt to the current situational context.

Based on this historical and situational context, this thesis focuses on understanding the dynamics of how large Korean firms have responded to radical change. From the



evolutionary point of view, radical changes in environment imply that firms should seek radically different ways of doing things in order to sustain continuous adaptation. However, it may not be easy for firms to change and thereby fit to such a new environment. Theoretically, adaptation, especially in the face of radical change, means a change in routines, strategy or structure (Dosi and Malerba, 1996; Levinthal, 1996). This may involve more complex organisational processes than those involved in incremental change.

In this thesis, ‘adaptation’ is defined as organisational responses to environmental change. This thesis debates on two different theoretical positions in explaining corporate adaptation: one that focuses on corporate restructuring, another that centres on corporate learning. Until the 1980s, in geography, a restructuring perspective had dominated in explaining corporate success and adaptation. It was argued that the continuous increase of international competition had eroded the competitiveness of large bureaucratic conglomerates with diversified businesses. A restructuring perspective deals with all the ways in which a firm adapts under pressure, from specialisation to downsizing and job cuts. The aim of corporate restructuring is to secure lasting competitive advantage through organisational changes, designed for cost cutting, the enhancement of productivity and the improvement of market positions (Hayter, 1997). In other words, the task of restructuring seeks changes in existing routine and structure. In this perspective, the outcome does not always lead to a revolutionary change or successful adaptation. What is emphasised instead is that corporate restructuring reflects the firm’s complex, multifaceted processes of adaptation to environmental change. But this perspective pays little attention to how firms adapt to environmental change and why some firms adapt successfully, while some others fail to adapt. Therefore, this perspective does not give insights into a context-specific explanation of corporate learning and adaptation.

More recently, especially since the 1990s, academic focus on corporate adaptation and evolution has shifted towards exploring the nature of learning that leads to the dynamic

competitiveness. This perspective, drawing upon evolutionary and competence-based theories of the firm, emphasises the influence of knowledge, learning and competence on corporate evolution and corporate success (Hodgson, 1998b; Amin and Cohendet, 1999, 2000). Learning is recognised as path-dependent or self-reinforcing in nature. For this reason, firms are seen to have, to a greater or lesser extent, difficulties in radically changing their routines and structure. It is argued that incremental learning, which means continuous improvements within existing routines, is important for competitiveness, but that it is less appropriate for radical shifts in environment. To adapt to such a circumstance, firms need to seek more strategic and radical learning, involving a series of strategic activities that seek innovation in organisation, process and products leading to new ways of doing things (Kuwada, 1998; Hudson, 2001). Learning which focuses on adaptation to radical change may pose a greater challenge to the firm than 'routine learning' (Amin and Cohendet, 1999), for it implies the unlearning of established routines and practices (Hedberg, 1981; Nystrom and Starbuck, 1984) or, at times, requires learning new knowledge outside of the firm to which it is likely to be difficult to have access (Amin and Wilkinson, 1999).

In this thesis, I will explore corporate learning and adaptation by combining a learning perspective and a restructuring perspective. That is because I believe that the dynamics of corporate adaptation and evolution are an outcome of the mixture of perpetual processes of restructuring and learning, both continuous and discontinuous. This thesis, therefore, attempts to recognise that both learning and restructuring are necessary conditions for short-term as well as long-term adaptation of the firm. This is to reject uni-dimensional explanations of corporate change. Based on this unity, some key arguments are proposed.

First, I attempt to recognise that learning and adaptation are a product of processes reflecting a variety of variables within and without a firm. This means to acknowledge the importance of institutional and firm-specific contexts that are likely to lead to the diversity and specificity of corporate adaptation and learning. There are a lot of factors

that make corporate learning and adaptation context-specific. These may include the firm's evolutionary trajectory and path-dependence, leadership, business strategy, characteristics of organisational knowledge and competences and the (spatial) forms of organisation.

Second, I argue that learning alone cannot guarantee short-term as well as long-term adaptation of the firm. My argument is that in the long-term, adaptability is sustained, or improved, through the combination of restructuring and learning in pursuit of adaptation. In a rapid shift in circumstances, firms tend to implement classical strategies of restructuring, such as the downsizing of non-profitable and marginal assets, employment adjustment or change of organisational structure. In some respects, these modes of adaptation are probably more critical than other dimensions such as technological learning and inter-firm alliances. In addition, there may be a difficulty in specifying strict boundaries between restructuring and learning. In some restructuring activities, successful adaptation is likely to be dependent upon learning processes followed in the course of restructuring.

Third, I argue that corporate learning requires taking advantage of knowledge in various forms. Some of these sources may exist beyond a boundary of the firm. As opposed to the view stressing the powers of tacit knowledge and incremental learning in sustaining a firm's competitive advantage, I emphasises that learning involves all forms of knowledge, including tacit and codified. As a result, the distinction made in the literature between incrementalism and radicalism in learning is difficult to make. Instead, I recognise that the interplay between incremental and radical learning is critical to understanding processes of learning-based adaptation.

Fourth, I want to challenge the growing received wisdom in economic geography on the benefits of localised learning for firm competitiveness and on the power of geographical proximity in learning. This tendency results from a lack of the proper consideration of how learning takes place in the firm and where the sources of knowledge and learning

come from. I will argue that geographical proximity alone is not sufficient for understanding the nature of learning and that 'proximity' in learning should be studied along relational/organisational dimensions that go beyond geographical dimensions.

These questions are theorised in more detail in the next two chapters, which form the conceptual framework for the later two corporate case studies. Chapter 2 attempts to conceptualise corporate adaptation, by drawing on various theories of the firm. To understand the dynamics of corporate adaptation in a context of radical change, the chapter presents a dual perspective on adaptation that incorporates a learning perspective and a restructuring perspective. By focusing on different sorts of learning and various types of restructuring strategy, it will argue that corporate adaptation seems, to a greater or lesser extent, to rely on both the process and outcome of organisational change, both strategic and non-strategic actions, and both the internal structure of governance and external environments. Additionally, it is emphasised that corporate adaptation, as far as corporate learning is concerned, can be dependent on a balanced combination of incremental and radical learning. This point of view implies the complex ways in which firms learn to adapt in the face of radical change – in ways that are different from textbook expectations. This chapter then approaches three different kinds of knowledge communities in the firm: communities of practice, epistemic communities and task-force teams. Its aim is to explore how corporate learning takes place in the firm and the role of these communities in learning and adaptation. Although each of these communities is distinct in terms of its origin and purpose, I suggest that these communities can be vital sources of both incremental and radical learning by drawing on tacit and codified knowledge in the process of their own problem-solving activities.

In Chapter 3, I review the geographical literature on learning and proximity that stresses the role of the regions and geographical proximity in sustaining competitive advantage. I develop an alternative, relational/organisational perspective on the sources of knowledge and learning in the firm. In doing this, I argue that geographical proximity

alone is not sufficient for understanding the nature of learning and thereby the centrality of proximity in learning should be studied along relational/organisational proximity that go beyond geographical proximity. I then stress that the sources of learning exist in organisational spaces, with complex geographies that not only mobilise distributed knowledge and competences but also combine varied forms of knowledge beyond the simple demarcation of tacit and codified knowledge.

These theoretical questions on learning and restructuring are investigated through case studies of two of Korea's largest electronics companies: LG Electronics Company (LGE) and Samsung Electronics Company (SEC).<sup>2</sup> Both companies are recognised as the flagship company of each chaebol group, the LG group and the Samsung group. In addition, they are rivals in both domestic and international markets in many segments of the electronics industry. Although both companies are the product of the same national institutional context and both are engaged in similar fields of electronics industry, they display differences in terms of corporate culture, managerial practices, evolutionary trajectory, business structure, core strengths (or competences), and spatial form of organisation. Like other big Korean firms, they have been at the forefront of pressure to restructure. In addition, both companies have increasingly faced intense competition in international markets and technologies: in the electronics industry, rapid technological progress led by technological convergence and an increasing market competition have forced firms to adapt rapidly. This makes them good choices to study the role of adaptation to radical changes.

In Chapter 4 the methodology of the empirical work is discussed. This chapter outlines the methodological underpinnings of this thesis and the issues raised by a fieldwork based on qualitative research methods such as interviewing and an analysis of secondary sources.

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<sup>2</sup> Daewoo, the third largest electronics firm, has undergone severe hardships after the crisis, since the Daewoo group has been dismantled owing to the failure of management. This constrained access to the firm.

Chapters 5 and 6 focus on LG and Samsung respectively. Each case study explores the diverse sources of adaptation, including downsizing, employment adjustment, production shifts, organisational and process innovations, technological learning. Chapter 5 on LG illustrates in particular the processes of learning, taking place between R&D units, and between R&D and manufacturing. This in-depth case study emphasises the influence of relational/organisational proximity on the changing process of R&D organisation. The chapter also reveals the dynamic ways of intra-firm social learning through both formal and informal groups which are seen as critical action learning groups for both incremental and radical learning. By contrast, chapter 6 on Samsung, with the particular focus on the role of the CEO's leadership, reveals a series of attempts to destroy path-dependence and sustain organisational innovation. This chapter starts by introducing a series of attempts to destroy path-dependence and to sustain organisational innovation together with the general process of restructuring in the face of the crisis. In turn, it explains the more detailed ways of restructuring and learning in radical shifts. It draws attention to geographies of corporate learning and the role of proximities. In doing so, it presents the clustering and co-location strategies of organisational units.

Chapter 7 compares the two companies to tease out similarities and differences in adaptation strategies, but also to identify the dimensions that influence restructuring and learning and lead to variations in these processes. The comparison between the two Korean firms is elaborated based on the theoretical framework explored in theory chapters. Throughout the whole chapter, an emphasis is placed on recognising the context specificity of corporate learning and adaptation. First, it highlights that traditional methods of restructuring can be used as a critical device to sustain learning and adaptation, particularly in the face of radical change. Second, the firm-specific context leads to different processes and ways of adaptation, particularly in terms of learning, as well as usages of space. Particular emphasis is on the spatial forms of organisation that make restructuring and learning strategies different. Finally, it highlights the role of formal learning as well as social learning in adaptation.

The concluding chapter challenges the existing theorisation of corporate learning and adaptation. It emphasises the context-specific nature of learning and adaptation, the indivisibility of restructuring and learning in sustaining continuous adaptation, the inseparability of incremental and radical learning, which indicates the incorporation of diverse forms of knowledge in learning, and the indivisibility of geographical and relational/organisational proximity for effective learning.

## Chapter 2

### Theorising corporate adaptation and learning

#### *2.1. Introduction*

In an era of economic globalisation, capitalist firms have been under great pressure to cope with increasing international competition in markets and technology. In this context, knowledge, learning and innovation have become fashionable words in the economic literature. Many argue that the capability to learn competitive knowledge is critical for the continuous survival and evolution of the firm. A great deal of attention has been paid to exploring the sources and generating mechanisms of learning and innovation. Among various theoretical perspectives aiming to explain corporate evolution and adaptation, a knowledge or competence-based approach has been recognised as a useful framework for understanding the dynamics of learning (e.g. Nelson and Winter, 1982; Foss, 1998; Hodgson, 1998).

From this approach conceiving the firm as a processor of knowledge and a learning entity, the knowledge residing in the firm is composed of organisational competences. It focuses on the problem of how competences are generated, maintained, replicated, and modified. This has a direct connection with learning. Learning is associated with the creation and development of competitive knowledge within the firm and its wider networks. However, such learning cannot take place in a social vacuum. Learning involves not only a cognitive process, which manifests in the acquiring, exchanging and transferring of knowledge in an organisational context (Odgaard and Hudson, 1998), but also a non-cognitive process, which is characterised by unconscious learning (Amin and Cohendet, 1999b; Wenger, 1998). However, whatever its nature, learning is achieved through social interactions between agents and can be of crucial importance to the continual adaptation and evolution of the firm.



Adaptation involves more than the dimension of learning, but the competence-based view tends to deal with aspects of adaptation only when discussing the pressures on organisational routines that are constructed as a result of continuous learning. The concept of adaptation needs to be conceptualised in a broader sense. In this chapter, I will define this concept as corporate responses to environmental change, which take various modes of restructuring and learning. In this sense, this chapter presents a dual perspective on adaptation, one that stresses both learning and wider restructuring. It emphasises that both are not completely independent and are complementary in corporate adaptation.

In the first part, I attempt to conceptualise corporate learning. I begin by defining such basic constituents as knowledge and competence, which are involved in the process and mechanism of learning. Then I explore the dynamics of the learning process, focusing on the context of organisational change and adaptation. The theoretical emphases are on the definition of 'learning' as incremental improvements drawing on the development of tacit knowledge as well as radical innovations based upon a series of strategic actions taken to access new knowledge. However, from the following sections, I question that a competence-based learning approach does not provide a sufficient understanding of how learning takes place in the firm and of what kinds of corporate strategy are sought to sustain adaptation and in what ways. This is an attempt to show that adaptation and learning are not pre-defined and self-evident.

Based on these questions, the following section attempts to explore the role of 'communities within the firm' in corporate learning and adaptation. Although there are various kinds of communities in the firm, this section deals with informal forms of organisation, including communities of practice, epistemic communities and task-force teams. Communities of practice would be helpful for understanding the characteristics of intra-firm social learning taking place through daily working processes, while epistemic communities and task-force teams are involved in intentional and strategic

learning. Although each of them is distinct in terms of its origin and purpose, I suggest that these communities can be vital sources of both incremental and radical learning by drawing on tacit and explicit knowledge in the process of their own problem-solving activities.

In section 2.4, I suggest that corporate restructuring is a means of sustaining corporate adaptation, and that its process and outcome rely on firm-specific contexts such as routines, learning and competences. Furthermore, corporate restructuring occurs through the adoption of multiple strategies, some of which entails learning associated with the continuous development and discontinuous creation of knowledge and competence. The first two parts are concerned with non-learning-based dimensions of restructuring such as downsizing, employment adjustment and organisational change, while the latter parts involve learning-based dimensions of restructuring such as strategic alliances, innovations in process, product and organisation. In the last section, I attempt to link a learning perspective and a restructuring perspective. Here, I argue that corporate adaptation can be better understood by combining both theoretical positions than only taking any one side between the two.

## ***2.2. Defining corporate adaptation***

One of the central themes in evolutionary and competence-based theories of the firm relates to how firms adapt to environmental change (Metcalf and Calderini, 1997).<sup>3</sup>

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<sup>3</sup> In fact, organisational theories also have a variety of theoretical branches, called Open Systems (OS) perspectives, which are closely associated with theorising the relationship between organisation and the environment. As Nohria and Gulati (1994) discuss:

An important contribution of OS theorists to organizational analysis has been their explicit focus on organizational adaptation over time. This has been sparked by the recognition that if organizations are a product of their environments, they must respond to changing environments over time. A crucial difference among OS theorists lies in their conception of the adaptive abilities of firms (p. 538).

Although my focus on the issue of adaptation is limited to evolutionary and competence-based theories of the firm and there is limited space to elaborate in full these organisational theories, it would be useful to

Adaptation is considered crucial for the survival and evolution of the firm, as business environments surrounding the firm have become increasingly complex and turbulent. Definitions of the term adaptation tend to be given with two contrasting perspectives. One view is interested in 'adaptation' in order to emphasise the path-dependent nature of organisational response to environmental change, while the second view recognises 'adaptation' as a product of firm's strategic and non-strategic responses to environmental change.

Some writers, who are interested in the influence of learning on organisational evolution and change, refer to the way in which firms show path-dependent responses to environmental change (e.g. Foss, 1998; Levitt and March, 1996). In evolutionary and competence-based theories of the firm, the firm is seen as a changing, but relatively durable entity, implying the possibility of the firm to change tends to become increasingly low over time (Hodgson, 1998b). This means that the state of the firm at a given point in time is path-dependent, signifying that present and past behaviours display a similar pattern (Foss, 1998; Nelson and Winter, 1982). The evolutionary path of the firm is embodied in organisational routines, which refer to regular and predictable behavioural patterns of firms.

For Levitt and March (1996: 517), the concept of 'routine' does not just include the forms, rules, procedures, conventions, strategies and technologies around which

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look at in brief each of theoretical streams in the context of adaptation as their theorising is to a great or less extent associated with evolutionary and institutional understanding of corporate learning and adaptation. First, the crux of structural contingency theory lies in the argument that firm's ability of adaptation to a specific environment depends on the fit between organisational structure and the environment (see Burns and Stalker, 1961; Lawrence and Lorsch, 1967 as the seminal work). Second, institutional theory is concerned with a broader social, cultural and institutional context that induces similarity in the behaviours of firms (see Scott, 1983, 1987; Davis and Powell, 1990 as the seminal work). This theory deals mainly with the influence of the state, professional employees within the organisation and other organisations in the process of institutional *isomorphism* (Nohria and Gulati, 1994). Third, resource dependence theory pays its primary attention to the role of inter-organisational networks as a strategic response to environmental uncertainty (see Pfeffer and Salancik, 1978; Thompson, 1967 as the seminal work). Fourth, population ecology theory takes a distinctive position by arguing that the specificity of environmental context determines the survival of organisations (see Hannan and Freeman, 1977 as the seminal work). In this theory the ability of organisations to adapt to the environment is ignored. In addition to these theories, Nohria and Gulati (1994) deal with a network theory and a transaction cost theory as part of OS theories.

organisations are constructed and through which they operate. It also involves the structure of beliefs, frameworks, paradigms, codes, culture, and knowledge that support, elaborate and contracts the formal routines. Specifically, routine is an executable capability for repeated performance in a context that an organisation in response to selective pressures has been familiar with (Cohen *et al.*, 1996). Organisational routines are transmitted and reproduced incrementally through both the intentional and unintentional behaviours of an organisation, although this does not mean that business behaviours always follow regular and predictable patterns. This is to emphasise that there are stochastic elements both in the determination and in the outcome of decisions (Nelson and Winter, 1982).

Organisational routines are created as the result of learning processes involving the construction of competences (Levinthal, 1996). In a relatively stable environment, such an attribute of routines therefore provides a source of organisational competences. It is, however, paradoxical that routine is likely to create an inertia that constrains organisational change. Inertia is often the product of successful adaptation to the past environment, as a firm develops ways of operating that appear well suited to its internal and external environment (Langlois and Robertson, 1995; Levinthal, 1991). There is the possibility that the path-dependent nature of organisational behaviour based on routines restricts organisational change, even in the face of stimuli external to the activity and decision rule in question (Helfat, 1998). The reason is that the strategies deployed in order to adapt to an established environment are not necessarily suited to a transformed environment. This implies that incremental or evolutionary adaptation can be the cause of an organisational lock-in that restricts adaptability to a changing environment. In this view, the term adaptation refers to the response to changes in environment.

However, this definition of adaptation is unnecessarily narrow. A firm's responses to environmental change can be diverse. Firms attempt to adapt to environmental turbulence by drawing on various adaptation strategies, such as changes in organisation,

leadership, product and process. For Laitinen (2000: 805), the adaptation strategy is defined as a response strategy to the environment. In a similar vein, Sharfman and Dean (1997) define 'adaptation' as the series of a firm's strategic choices about how the organisation should respond to perceived threats or opportunities. Dosi and Malerba (1996) argue that adaptation occurs when the firm changes its strategy, structure or some other core attribute to fit some new environmental contingency.

In a nutshell, adaptation represents organisational responses to environmental change. When we understand the concept of adaptation like this, not all the strategies that firms deploy may entail learning in a direct way (Levinthal, 1996). Some of the adaptation strategies may centre on gaining new knowledge and competences and sustaining organisational and technological innovations, which will necessarily be accompanied by a learning process. Those may include inter-firm alliances and R&D activities. Meanwhile, other forms of firm strategy can concentrate on cost reduction through the dimensions of restructuring such as downsizing, employment adjustment and organisational change. It can be assumed that these two forms of adaptation strategies involve distinctive processes that have little to do with one another. However, I argue that both forms of adaptation strategies need to be understood as complementary or, in some sense, indivisible processes, as effective adaptation can be realised through complex organisational processes that bring together restructuring and learning. The next section takes into account a learning perspective on adaptation.

### ***2.3. A competence-based learning perspective***

#### ***2.3.1. Learning and competence***

The recent development of the competence-based approach to the firm has put the concept of learning at the forefront of studies on organisational change. Learning is regarded as the development of skills and knowledge via access to new knowledge or

the improvement of an established knowledge structure. This definition recognises that learning relates to the creation and development of knowledge and competence through mobilising existing internal knowledge, as well as through the acquisition of knowledge outside of the firm.

Since organisational theorists such as Selznick (1957) and Penrose (1959) introduced the concept of competence to identify the distinction between firms, it has become a major concept in the evolutionary and competence-based theories of the firm. Competence means what firms 'can do well' and 'core competence' what they can do 'better than the others' (Prahalad and Hamel, 1990). The concept of 'distinctive competence' expresses the distinction between internal resources such as knowledge and competences and the different potential for continuous evolution that exist between individual firms. Competences are basically said to include the sets of routines, differentiated skills and knowledge, the ability to combine these sets of knowledge, and secondary assets which express the efficiency of problem-solving procedures (Cohendet *et al.*, 1999). More specifically, the constituent elements of organisational competences include the ability to access, incorporate and use externally derived information and knowledge, the capability to learn and generate knowledge and information internally, the mastery of technologies and production, the applicability and effectiveness of problem-solving procedures, and the understanding of demand and user's requirements (Dosi and Malerba, 1996). On the other hand, competences could also imply firm-specific routines that coordinate and govern corporate internal relationships (Coriat and Dosi, 1998).

Looking at these characteristics, it can be argued that competences do not lie in particular products or markets, but in organisational processes and capabilities that enable firms to co-ordinate activities and make use of their assets (Liedtka, 1999). Moreover, organisational competences are said to be collective and tacit. They cannot be reduced to the sum of competences possessed by members of the organisation, because they tend to be embedded in the nature of collective social relationships within

the organisation. In addition, competence, particularly core competence, is seen as non-transferrable and inimitable. This highlights the differences in dynamic competences among firms (Foss, 1993; Hodgson, 1998). In this view, the firm is seen as an entity seeking to obtain and sustain a competitive advantage through the cumulative development of a distinctive set of organisational competences (Liedtka, 1999). In this respect, organisational competences constitute the basis of competitive advantage and learning is central to creating and promoting competences.

The idea of firm-specific competence has been developed from the competence-based approach to the firm. In contrast to the contractual approach that conceives the firm as simply 'a processor of information' for optimising allocation of resources, the competence-based approach recognises the firm as not only 'a repository of knowledge, experience, and skill' but also as 'a processor of knowledge' for creating resources which consist of a firm's competitive competences (Amin and Cohendet, 1999a). In this sense, knowledge becomes a crucial element of organisational competence.

### ***2.3.2. Knowledge and learning***

Competence-based firm theorists stress the distinction between knowledge and information. According to them, information is a basic constituent necessary for the production of knowledge. On the other hand, knowledge is produced through a process of cognition and interpretation. Kogut and Zander (1992) state that information implies a know-what, while knowledge implies a know-how. In their OECD report on the knowledge-based economy (1996: 12), Foray and Lundvall also argue that the concept of knowledge is much broader than information, because of its tacit dimension. They distinguish between the know-what and know-why as codified forms of knowledge and the know-how and know-who as tacit forms of knowledge. The 'know-what' refers to knowledge about facts that usually exist in the form of codified information, while the 'know-why' means the scientific knowledge of the principles that underlies technological development in most industries. These forms of

knowledge can be codified and obtained through reading scripts and books, attending lectures and conferences and accessing databases. By contrast, the 'know-how' refers to skills or the capability to solve a certain problem. The 'know-who' involves information about who knows what and who knows how to do what. Thus it is often said to be a prerequisite for the formation of social networks that are critical not just to access external sources of knowledge but also to make use of that knowledge efficiently. These forms of knowledge are tacit, being difficult to transfer from one person to another.

Since Michael Polanyi (1967) who emphasised some years ago the tacit dimension in the epistemology of knowledge, scholars have discussed the role of diverse forms of knowledge in organisational competence. Two forms of knowledge especially are contrasted: the tacit and the codified. Tacit or non-codified knowledge involves specific skills and know-how, which are not transferable beyond the context in which they are produced and embedded. Tacit knowledge can be acquired through experience, direct observation, imitation and interaction (Hodgson, 1999). These can be devised through on-the-job-training, apprenticeship and daily work practice, personal rotation, informal meeting, block conference and so on.

Some types of learning are related to the acquisition of tacit knowledge. For example, Arrow (1962) refers to 'learning-by-doing' as a way of acquiring knowledge. Learning-by-doing takes place through daily work process. Through experience and trial and error, people can gain tacit knowledge in the form of skill and know-how. Lundvall (1988) uses 'learning-by-interacting' to stress the social dimension of learning. The idea is that learning processes based on reciprocal interactions between agents, particularly firms, promote the acquisition and exchange of knowledge. However, it does not mean that these are sufficient for the dissemination and exchange of tacit knowledge such as know-how and skills. Although tacit knowledge can be assimilated through these learning practices, it seems to be at best partial. This makes the codification and transfer of tacit knowledge difficult. The reason is that tacit



knowledge tends to be embedded in specific personal and organisational skills and the complexity of human relationships.

Non-explicit or tacit knowledge can be embodied at the individual level as well as the collective level. Tacit knowledge that individuals gain as a product of learning-by-doing is difficult to share and formalise at the collective level. However, once knowledge is acquired at the organisational level, it tends to be memorised in the form of routines, conceived as the behavioural pattern of an organisation (Hodgson, 1998; Leroy and Ramanantsoa, 1997). The routinisation of tacit knowledge tends to form organisational competence. This means that organisational competence is composed of competitive knowledge. Since tacit knowledge and competences, which are embedded in a specific organisational context, are not immediately transparent, they are difficult to accurately duplicate in the different organisational and institutional contexts. However, there is the danger that competences may be turned into a lock-in over time, which could impede the chance to learn external knowledge and consequently curtail adaptability to environmental change.

Table 2.1 Types of knowledge and the sources of learning

	<i>Tacit</i>	<i>Codified</i>
<i>Internal</i>	Learning by doing	In-house R&D
	Learning in doing/working	Intrafirm training programmes
	On-the-job training	
<i>External</i>	Largely localised tacit knowledge	Inter-firm alliances and joint ventures
	Face-to-face contact and informal	Technological licensing
	exchanges by acquaintances	Conferences, journals, texts and the like

As opposed to tacit knowledge, codified or formal knowledge involves scientific and other forms of knowledge, scripted or formalised in the form of patents, books, papers, tapes, and so on. It is assumed that codified knowledge can easily be transferred. However, it does not imply necessarily that this process makes codified knowledge no longer important. As recently argued by Zack (1999) and others, formal knowledge,

such as procedure manuals, product literature, patents and computer software, does not only plays a large role in organisations, but is also a crucial factor for the production of knowledge. Formal knowledge has a ubiquitous nature once access to its sources is mastered, but the entry barriers to new knowledge can be considerable (Amin and Wilkinson, 1999). These include the lack of absorptive capacity and the difficulties of accessing valued codified knowledge such as patents. For the former, Cowan *et al.* (1999) point out that the tacit nature of specific codified knowledge tends to be a barrier to learning and the dissemination of knowledge. If a specific group or organisation retains competitive tacit knowledge, members of that group or organisation may make a codebook to share between them. As such a codebook is designed and made for only a certain group or organisation, outsiders may have difficulty in accessing the knowledge it contains. This knowledge, although taking an explicitly codified form, may therefore be tacit for others and remain the property of the group. For others to be able to access such a form of knowledge, they have to possess the capability to acquire, decode and absorb that knowledge. In other words they need 'absorptive capacity'.

On the other hand, some kinds of formal knowledge, such as patents, may be critical for firms to sustain their competitive advantages in the market competition. It emphasises the importance of the appropriation of knowledge in capitalist competition. Thus, firms possessing competitive formal knowledge make great efforts to monopolise and appropriate such knowledge. In this sense, a prime issue for latecomer firms is likely to include the problem of how to access formal knowledge as well as of how to develop tacit knowledge. Once firms succeed in accessing formal knowledge, the focus is on how to incorporate this new knowledge into the organisation and how to sustain an optimal combination between the new formal knowledge and the tacit knowledge embedded in the organisation.

In sum, these characteristics of knowledge show that both forms of knowledge do not exist completely independently. The acquisition of formal knowledge needs tacit knowledge in the form of skills and know-how, while tacit knowledge needs to be

codified within the firm. There is no doubt that tacit knowledge can be a basis for the development of core competence. However, once tacit knowledge becomes core competence, it conversely becomes a basis for core rigidity, which may result in inadaptability to change. Thus, continuous corporate adaptation may depend on how core competences can change to fit a new environment. To do this, firms need to combine and harmonise embedded tacit knowledge and external codified knowledge. Based on this discussion, the following section deals with modes of learning in the context of adaptation.

### ***2.3.3. Modes of learning and the problem of adaptation***

Organisational learning is not a simple process in its own right. Learning involves cognitive processes, manifest in the process of acquiring, exchanging, applying, transferring and modifying knowledge in an organisational context (Hayes and Allison, 1998; Odgaard and Hudson, 1998). However, processes of learning may differ, depending on the nature of organisational responses to changes in the internal and external environments of the firm. They also differ in outcomes.

Argyris and Schon (1978), for example, distinguish 'single-loop learning' from 'double-loop learning'. Single-loop learning involves incremental change within an existing framework. This type of learning implies the reinforcement and refinement of existing routines as well as the improvement of the knowledge base or firm-specific competences without changing underlying norms and assumptions (Dodgson, 1993). Learning processes are characterised by a single feed back loop that involves a process of stimulus-response to the results. The goal of learning is how to best keep organisational performance within the ranges set by organisational norms and how to best achieve existing goals and objectives (Argyris and Schon, 1978). The norms and values of the organisation remain unchanged.

For this reason, learning is said to be necessarily path-dependent and self-reinforcing.

Continuous learning, which is not aimed at changing routines, is likely to induce the development of firm-specific competences. Simultaneously, these competences become a set of routines that constitute the problem-solving process (Dosi and Marengo, 1994; Foss, 1998; Nelson and Winter, 1982). Routines, once established in an organisation, tend to persist with existing learning processes. The self-reinforcing nature of learning makes it attractive for the firm to sustain its current focus (Levinthal, 1996), which can lead to the 'competence trap' (Levitt and March, 1996). The success of past strategies tends to result in complacency and sometimes the failure to adapt in the face of environmental change (Liedtka, 1999).

There is the possibility that an organisation will persist in its existing ways of doing things, even in situations where existing routines are no longer adaptable to changes in the environment. Tushman and O'Reilly (1996) note that the corporate evolution is, to a greater or lesser extent, influenced by organisational inertia, including both structural and cultural dimensions. Structural inertia means a resistance to change which is rooted in the size, complexity and inter-dependence of the organisation's structure, systems, procedures and processes, whereas cultural inertia comes from age and success. Some claim that the older the age of the firm the more difficult the firm find it to cope effectively with a rapidly changing environment due to the path-dependent nature of learning (Levinthal, 1996; Teece *et al.*, 1997). Therefore, single-loop learning or exploitation is likely to be effective in either a stable environment or in the short run, but is problematic in the long run. This is the reason why firms need to seek double-loop learning to sustain continuous adaptation and long-term competitiveness.

Double-loop learning entails transformative change accompanied by changes in the firm-specific knowledge base, competences and routines. While single-loop learning is reactive, double-loop learning is strategic. Thus, both dimensions of learning are qualitatively different. Double-loop learning is required when existing competences or routines become obsolete due to radical changes in the internal or external environments of the organisation. This is likely to take place when the organisation seeks radical

innovations in products, processes and organisation (Hudson, 2001). The sources of knowledge for radical innovations comes mainly from learning channels such as R&D activities and external institutions, including competing firms, universities and R&D institutions (Gertler, 2000; 2001a).

The process of double-loop learning involves an 'unlearning' process, which is defined as a process through which the organisation discards obsolete and misleading knowledge and routines (Hedberg, 1981; Nystrom and Starbuck, 1984). The more rapid the environmental changes, the more crucial the ability of the firm to unlearn obsolete routines becomes for its survival. In this sense, double-loop learning is more complicated and difficult to implement than single-loop learning. As Argyris and Schon (1978) point out, most organisations do quite well with single-loop learning, but have great difficulties with double-loop learning. Hedberg (1981) goes so far as to argue that forgetting established knowledge and routines could be even harder than acquiring new knowledge. There are some means of unlearning, however. The first is to discharge employees, especially corporate leaders or managers who are unable to move away from outdated ways of doing things (Tunstall, 1983; cited in Huber, 1996) and instead to recruit people who have new insights and perspectives. Secondly, as unlearning is likely to take place when a firm faces a crisis in internal or external environments, unlearning can be induced by intentionally infusing employees with a sense of crisis (see, for example, Kim, 1998).

Regarding the arguments stated above, one might say that existing knowledge bases, competences and routines could hamper new learning as well as degrade an adaptability to change. However, this is only partially true, as not all established organisational knowledge and routines are obsolete for sustaining discontinuous learning and radical adaptation. The knowledge base that is accumulated within the organisation as a result of continuous learning is a prerequisite for new learning. The reason is that the effective learning of new knowledge requires absorptive capacity which depends on a prior knowledge base (Cohen and Levinthal, 1990). A prior knowledge base

comprises tacit knowledge, such as know-how and skills, including the problem-solving capabilities. Nooteboom (1999a) argues that a prior knowledge base is helpful when new learning is sought in a novel way but related to an existing system. This means that the acquisition of new knowledge and learning cannot be separated from an organisation's knowledge base and routines. In sum, a crucial challenge for firms to adapt to radical changes might be not to specialise in any one type of learning, but to sustain a balanced combination of continuous learning (single-loop) and discontinuous learning (double-loop).

To conclude, a competence-based learning perspective provides a clear implication for corporate adaptation. That is, adaptation is dependent on how the firm is able to sustain continuous and discontinuous learning by combining various forms of knowledge through effectively monitoring the changing nature of business environment. Despite its well-defined understanding of corporate dynamics, the competence-based view is silent on the mechanisms and processes through which firms learn and adapt. In other words, a matter of how learning occurs in the firm tends to be taken as given in the competence-based view. In addition, this view is little to say about the detailed processes of corporate strategies taken to adapt to radical change. In what follows, I suggest theoretical positions that complement a competence-based learning perspective in order to make clear an understanding of processes and mechanisms of corporate adaptation. In the following section 2.4, I attempt to explore how learning takes place in the firm by drawing on 'learning communities'. In the last section, I attempt to tackle various dimensions of the corporate restructuring which is undertaken to adapt to changes.

## ***2.4. Learning and communities in the firm***

Following the conceptualisation of learning and adaptation, this section places its focus on 'learning communities' that are assumed as the sources of learning and knowledge

creation. Although there are various kinds of communities in the firm, this section deals with informal forms of organisation, including communities of practice, epistemic communities and task-force teams. Communities of practice would be helpful for understanding the characteristics of intra-firm social learning taking place through daily working processes, while epistemic communities and task-force teams are involved in intentional and strategic learning. Although each of them is distinct in terms of its origin and purpose, I suggest that these communities can be vital sources of both incremental and radical learning in the process of their own problem-solving activities.

In this section, I suggest that corporate learning which is either incremental or radical takes place through organising various forms of learning communities. This means that these learning communities could affect outcomes of learning and the potential of adaptation to environmental change.

#### ***2.4.1. Learning through communities of practice***

In recent years, some learning theorists have argued that organisational learning does not necessarily take place through conscious design or formally recognizable cognitive frames (Amin and Cohendet, 1999b; Brown and Duguid, 1991; Fox, 2000; Garrety *et al.*, 2001; Lave and Wenger, 1990; Wenger, 1998). This assumption can be found in the literature that deals particularly with the success of Japanese firms (see, for example, Aoki and Dore, 1994; Kenney and Florida, 1993). It is argued that competitive Japanese firms tend to improve knowledge and skills (*Kaizen*) and even sustain technological and organisational innovations, through daily common interactions, communications and informal meetings between peers in the workplace. In a similar manner, Amin and Cohendet (1999) argue that in addition to formal sources of learning such as R&D, daily practice among individuals and groups within firms can also be a vital source of learning, through forms of knowledge – mostly tacit knowledge – generated in practice, social action and interaction, via communities of practice within firms.

In fact, every organisation is made up of many communities of practice in which learning is a matter of new meaning and emergent structures arising from common enterprise, experience and sociability – learning in doing (Wenger, 1998; Amin and Cohendet, 1999b). For Wenger and Snyder (2000), communities of practice are defined as groups of people informally bound together by shared expertise and passion for a joint enterprise – for example, engineers engaged in deep-water drilling consultants who specialise in strategic marketing, or frontline managers in charge of check processing at a large commercial bank. Thus, communities of practice are homogeneous groups that are composed of people engaged in the same practice, in regular communication with others. They describe the common features of communities of practice.

Some communities of practice meet regularly - for lunch on Thursdays, say. Others are connected primarily by e-mail networks. A community of practice may or may not have an explicit agenda on a given week, and even if it does, it may not follow the agenda closely. Inevitably, however, people in communities of practice share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems (pp. 139-140).

It implies that the source of learning in communities of practice is experience, interaction and shared meaning between members of the community. This view of communities of practice allows us to understand the nature of learning as a multiple, ongoing, distributed process (Amin and Cohendet, 1999b), as well as a socially constructed process (Brown and Duguid, 1991; Wenger, 1998). In detail, the nature of learning requires participation in the doing, the sharing of perspectives about the doing itself, and the mutual development of both individual and collective capabilities in the process (Lave and Wenger, 1990). Within communities of practice, people share tacit knowledge through dialogue, exchange ideas about work practice, and experiment with new methods and ideas (Hendry, 1996). Informed dialogue between members is central to the on-going co-evolution of meaning and capabilities, because the work itself is central to the community of practice, and because meaning, purpose, and learning are



tied to the doing (Liedtka, 1999:7).

Communities of practice differ from formal organisations – or formal communities – within the firm such as functional groups (see Table 2.2). The latter refers to organisational units with a specialised domain of work and compartmentalised by the nature of labour (for example, manufacturing, marketing, R&D and so on). Members of a functional group are composed of homogeneous agents sharing a disciplinary specialisation. By contrast, communities of practice are informal. They are not created, but evolve through a self-organizing process based on mutually committed interactions. Once again, Wenger and Snyder (2000) explain:

Membership in a community of practice is self-selected. In other words, people in such communities tend to know when and if they should join. They know if they have something to give and whether they are likely to take something away. And members of an existing community, when they invite someone to join, also operate on a gut sense of the prospective member's appropriateness for the group (pp. 141-142).

Communities of practice exist in the minds of their members in the connection that they have with each other and with the larger institution in which they reside (Brown and Duguid, 1991). Thus the creation of a community resides in a set of shared meanings that are intimately bound up with the practice of the work itself, the purpose and the people that such work serves and the on-going development of its individual members. Within the firm, communities of practice thus consist of hybrid groups of overlapping and interdependent communities (Brown and Duguid, 1998). Knowledge, rules for action and culture can be spread at an organisation-wide level, through vigorous links and communication between communities of practice.

Basically, communities of practice are created and managed as a means to enhance the individual competences of their members (Cohendet, Creplet and Dupouet, 2000). However, they can also make a contribution to the shaping of new problem-solving routines in the context of radical learning. This implies that communities of practice can be the sources of radical innovation in response to dramatic events, as well as of

incremental learning. Hutchins (1996) gives an example of adaptation to a radical situation, by showing how a navigation team facing a critical moment in the middle of a cruise arrives at a new stable procedure. The story is summarised as follows:

Following a chaotic and unsuccessful search for a solution through experiments and computational and textual alternatives, the team developed an answer through doing. As local tasks were found for individuals distributed across the ship, the ensuing sequence of actions and conversations, drawing on experience and experimentation, led to the construction of a solution based on trial and testing. On this occasion, a solution was found on time (Amin and Cohendet, 1999b: 18).

Here, the navigation team looks like a community of practice and successful adaptation is driven by learning in doing, recursive communications and trial and testing between team members. Hutchins' study suggests that radical innovations can be attained not just through learning by design, but also through learning in doing. Let me describe in more detail the process of building communities of practice and the learning process, through three infrastructures of learning.

When trying to establish new codified knowledge in the form of a new technology or machine, some of the people involved in this project may feel the need to voluntarily create a discussion group or a study group. Perhaps, most of the people who intend to participate the community share common work practice and they are interested in sharing and learning useful knowledge. In managing the community, participants may make use of tacit rules and norms that are required to shape a mutual engagement among them. '*Mutual engagement*' is a prior condition that allows the community to accept a variety of interests and cognition; to do things they seek to do together; to have mutual values, trust, reciprocity and sharedness; and to manage their community. From this, the community members come to recognise the basis of what they should and should not do and why.

The second stage is '*joint enterprise*' which implies that it begins with practice in the community in reality. Doing together reflects the multiple voices among members and

the need to negotiate. Things that have been agreed might be continued through experimental and reflexive processes, in the form of trial and error, continual sense making, understanding and reconciliation. During that time, some may secede from the community while, conversely, new members may come. This gives the community opportunities to renovate, as they may bring new experience and knowledge into the community. They can be 'knowledge brokers' between different communities. This is the reason why boundary blurring is important for learning and innovation. In doing so, mutual accountability will arise and a local code of practice will be created.

In the next stage, both visible and invisible performances, experienced and shaped through the process of materialisation will need to be codified as well as shared among members. In this sense, the third stage, which is called '*shared repertoire*', is crucial in sustaining a learning community and leading to innovation. To share performances and outcomes, members of a community might draw upon stories, artefacts, discourses, concepts, historical events and discourses. These can be shared or publicised via cutting edge ICTs, such as databank and the Internet. But it needs more. Some aspects of their performances and outcomes are necessary to publicise to people beyond the boundary, such as other communities of practice or the rest of the workers in the firm. They may discuss what is wrong or right in doing something. By this stage, the capability of the organisation to solve problems will be increasingly enhanced. This stage will also help to diffuse knowledge within the firm. Ultimately, the new routine will be successfully embedded in the organisation. Although the process described above is interpreted in quite a simplified manner, it helps us to understand the role of communities of practice in learning.

However, it should be noted that communities of practice do not always play a key role in inducing radical innovations, nor can they be created, or work well, in all firms. Basically, a community of practice is a kind of knowledge community where members learn the knowledge that is embedded in the community. Thus communities of practice are more likely to contribute to improving existing routines through

incremental learning and an exploitation of best practice rather than to explore new routines or radical innovations (Cohendet and Llerena, 2001). Moreover, communities of practice work well in firms that are characterised by corporate cultures, emphasizing diversity, autonomy and individual empowerment, but would not fit in some cultures, and they are not a good means of dealing with more urgent, difficult matters of business change (Davenport, 2000: 9). To deal with more uncertain or complex issues, alternative communities are often organised in and beyond the firm. In what follows, I suggest two kinds of communities; epistemic communities and project (or task-force) teams.

#### ***2.4.2. Learning through epistemic communities***

The original concept of ‘epistemic communities’ was developed in international relations dealing with the decision-making process of international environmental issues. In this realm, the concept is defined as ‘a network of professionals with recognised expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area’ (Haas, 1992: 3). Epistemic communities are similar to communities of practice, for example in terms of the process of interaction between members and their attitudes and behaviours. However, epistemic communities differ from communities of practice in many ways. Epistemic communities are intentional and strategic, because they are organised to collectively solve a certain problem, or to sustain knowledge creation in a specific area. In this sense, Storck and Hill (2000) call these communities ‘strategic communities’, to emphasise the strategic nature of this type of knowledge community.

Another important dimension that distinguishes those from communities of practice is that epistemic communities have a commonly understood procedural authority, which is needed for effectively achieving the objective. Epistemic communities can be established when members of a community have procedural authority which every member commonly understands and accepts (Cowan, David and Foray, 1999). The

procedural authority conveys the idea of progress towards a cognitive goal set by the community and becomes a guideline to manage this community, thereby playing a key role in holding the community members together (Cohendet, Creplet and Dupouet, 2000). The existence of procedural authority and the strategic nature of the organisation imply that, in epistemic communities, autonomy and identity tend to be weaker than in communities of practice.

The goal of epistemic communities does not lie in the achievement of individual interests or the improvement of individual competence. Rather, epistemic communities are centred on the achievement of a strategic goal and the codification of the knowledge they intend to create. Members of an epistemic community are bound together by their commitment to enhance a particular set of knowledge (Cohendet, Creplet and Dupouet, 2000). The community members are composed of professionals with recognised expertise and competence, who are fit for a strategic goal, beyond geographical and functional boundaries. In this sense, this type of learning community provides the potential for not only making great use of dispersed human resources and knowledge within the organisation but also for utilizing the benefits of communities of practice in terms of learning and knowledge creation. Epistemic communities enable firms to deal with continuous changes in the business environment. More crucial is the fact that epistemic communities seem to be better at handling unstructured problems than communities of practice.

#### ***2.4.3. Learning through task-force (or project) teams***

A task-force (or project) team is one of the communities in the firm, which is committed to the strategic production of knowledge and the way of solving a specific problem at a given point in time. This community is an *ad hoc* temporary organisation that is designed to accomplish a specified task. As task-force teams are goal-oriented in nature, they are managed under clear-cut time limitation. Task-force teams are heterogeneous groups of employees with professional knowledge in a given task,

selected from different teams or departments. Members of the task-force team attempt to mobilise individual knowledge and competences in order to achieve the goal of a given task within a certain time frame.

A task-force team is strategically created to make use of the benefits of diversity in evolutionary terms. An evolutionary perspective sees that the assets of organisational competence and learning capability tend to result from cognitive diversity among organisational members (Cohendet and Llerena, 1997; Metcalfe, 1998a; Saviotti, 1996). This implies that task-force teams are a kind of organisational tool that tries to create hybrids of the different communities (Cohendet and Llerena, 2001). Coming from different units of organisation, members of the task force team are characterised by distinct cognitive frames as they are specialised in distinct fields of work with different interests. Sometimes, this cognitive distance can bring about difficulties in deriving a consensus and identity between the members of the team. Nevertheless, once mutual trust has been built a common identity and consensus established, the task-force team could be a driving force of innovation. The nature of social relationships between team members reflects the characteristics of communities of practice, and results in the collateral effect of the creation of knowledge by creating quasi-communities of practice.

However, there are fundamental differences between task-force teams and communities of practice. As communities of practice do not have a strategic objective and obligation, their capabilities to mobilise the resources most appropriate for seeking radical learning may be restricted. On the other hand, a task-force team binds members of the team together through a given goal and accountability. In addition, its members are a group of people who have the best knowledge in relation to the project. Thus, this form of organisation is suitable for making good use of the individual knowledge and competences decentralised across organisational boundaries.

Table 2.2 A typology of communities within the firm

	<i>Functional groups</i>	<i>Project teams</i>	<i>Epistemic communities</i>	<i>Communities of practice</i>	<i>Informal networks</i>
<i>Goal</i>	To deliver a product or service	To accomplish a specified task	To deal with unstructured problem or produce knowledge	To develop members' capabilities; To build and exchange knowledge	To collect and pass on business information
<i>Membership</i>	Everyone who reports to the group's manager	Assigned by senior management	Defined by organisational function, but chosen by individuals whether to be active or not	Members who select themselves	Friends and business acquaintances
<i>Agents</i>	Homogeneous	Heterogeneous	Heterogeneous	Homogeneous	Heterogeneous
<i>Rules</i>	Manifest formal rules	Manifest regulation and obligation for action	No regulation, no obligation, but manifest procedural authority	No regulation, no obligation	No regulation, no obligation
<i>Driving force that holds it together?</i>	Job requirements and common goals	The project's milestones and goals	Procedural authority or its own governance processes	Passion, commitment, and identification with the groups expertise	Mutual needs
<i>Duration</i>	Until the next reorganisation	Until the project has been completed	Normally until the common goal has been finished but as long as the community want to continue their activities	As long as there is interest in maintaining the group	As long as people have a reason to connect
<i>Knowledge production and the mode of learning</i>	Unintended Learning by doing	Unintended Learning by interacting between members	Intended Learning by searching, Learning by interacting	Unintended Learning in doing/working	Intended or unintended Dependence on social ties and intention to learn and share knowledge

Sources: based on Wenger and Snyder (2000); Cohendet, Creplet and Dupouet (2000); Storck and Hill (2000)

In many ways, the nature of a project or task transcends boundaries of demarcated formal work groups. In this case, traditional work groups seem to be unsuited for mobilising the knowledge and competences decentralised across the boundaries of formal organisational units. It has been argued that the bureaucratic nature of large modern business organisations is inflexible and inadaptatable in an age of rapidly changing market and technology (Nonaka and Takeuchi, 1995). In this context, organising task-force teams is seen as an effective means to sustaining strategic learning, which needs to efficiently mobilise decentralised competences and quickly reach a strategic goal.

## ***2.5. A restructuring perspective***

Since the 1950s, the radical increase in international competition in markets and technology has led to the decline of many large Western firms' monopolistic competitive positions. Many of them have responded by restructuring. According to Rock and Rock (1990), during the 1980s, in particular, nearly half of all large US firms undertook restructuring. In that period, the focus of corporate restructuring was on the reorganisation of the business portfolio through downsizing or Mergers & Acquisitions (M&A). It is true that capitalist firms have restructured in response to the changing market and technology. However, the recent tendency in corporate restructuring differs from that of the past. Corporate restructuring has become more complex and multifaceted. This is because not only has inter-firm competition become increasingly intensified, but also the pace of change in market and technology has significantly accelerated.

In this context, defining 'corporate restructuring' is not easy. Usui and Colignon (1996) argue that whatever a firm does under pressure can be referred to as corporate restructuring. They summarise the dimensions of corporate restructuring as follows: the elimination of product lines, the combination of internal units, new stock offerings,



early retirements, the sale of nonessential units, plant closure, the externalisation of employment by taking regular employees out and relying more on contract or temporary workers, the replacement of top executives and board members, the reallocation of employees, and a change of decision-making location (centralisation or decentralisation) (p. 517). According to Hayter (1997), corporate restructuring involves corporate activities aimed at lowering costs, enhancing productivity and improving market position. It implies the search for flexibility in technology, production, organisation, markets, location and labour. Each of these becomes the theme of corporate restructuring, and in many ways, they become interwoven in the process of restructuring. In management terms, Bowman and Singh (1990) define corporate restructuring more precisely as a change in assets, financial portfolio or management. Asset restructuring consists of adjusting a business portfolio through downsizing, mergers, acquisitions and joint ventures. Financial restructuring involves changes in the capital structure of the firm. This means the infusion of high levels of debt to increase the leverage of the firm to reduce the likelihood of a takeover. Management restructuring involves significant changes in organisational structure to increase the efficiency of management.

It is assumed that the notion of restructuring involves a revolutionary change, a qualitative transformation from one state to another (see for example Lovering, 1989). However, it does not necessarily involve such a complete transition (Hoggart and Paniagua, 2001), nor do all processes of corporate restructuring lead to revolutionary change. Rather, it is better to view corporate restructuring as an on-going process of qualitative change. Corporate restructuring can also be accomplished through incremental processes of organisational change. In addition, corporate restructuring is context-dependent, as its process depends on the nature of the industry in which firms are engaged, and their environment. Let me take an example. For firms operating in a mature industry and stable market, the key to adaptation seems to be factors like cost, efficiency, and incremental innovation. On the other hand, firms competing in an emerging industry and an unpredictable market need to make great efforts to develop

new products and ways of doing things in order to adapt the market to a given environmental situation.

Therefore, corporate restructuring is, in many ways, the outcome of specific corporate strategies developed to adapt to a changing environment. However, it is difficult to see corporate restructuring as the result of an optimal reaction to or interpretation of a changing external environment (McGrath-Champ, 1999). As described above, corporate restructuring strategies are complex and multifaceted, reflecting the process of adaptation to environmental change. This implies that a restructuring approach can provide useful insights into what is needed for corporate adaptation. This is a critical aspect that the learning perspective tends to overlook by focusing largely on the development of organisational knowledge and competence. In addition, some of corporate restructuring strategies involve learning either directly or indirectly. The following sections explain some examples of corporate restructuring in more detail and show how they facilitate adaptation. The first two represent non-learning-based dimensions of restructuring, while the latter parts involve learning-based dimensions of restructuring.

### ***2.5.1. Downsizing***

Downsizing is referred to as a means to reduce the size and scope of firm's activities. This has long been recognised as the most conventional way of restructuring taken by firms facing a substantial decline in operating performance. The 1980s are characterised by the tendency for large U.S. companies to move towards a 'lean' architecture of organisation and industrial specialisation (Harrison, 1994; Hatfield, Liebeskind and Opler, 1996). Business conglomerates became difficult to deal with business diversification and economies of scale because of decline and fluctuation in consumer demands and increasing competition in technology and markets. 'Lean production' and a retreat to the 'core competences' became prevalent among big firms and, consequently, these led to strategic downsizing (Harrison, 1994). The aim of

downsizing is to abandon business lines, which are seen as peripheral to core business or businesses, or the long-term strategy of the firm. The recent tendencies in the restructuring of productive organisation, such as the movement from vertical integration towards vertical disintegration and the significant increase of outsourcing, exemplify one outcome of strategic downsizing by big firms (Sayer and Walker, 1992). Downsizing in productive organisation can also be done by the selective closure and rationalisation of production facilities.

Employment adjustment, such as lay-offs, is another means of downsizing. Its aim is to reduce labour costs. However, firms find it difficult to sustain their competitiveness solely by lowering labour costs. Therefore, they try to increase productivity by intensifying work practices. The prevailing conceptions of 'knowledge workers' (Delbridge *et al.*, 1998; Fruin, 1997; Kenney and Florida, 1993; Lowe *et al.*, 1997) and 'the learning firm' (Hudson, 1999; Asheim, 2000) emphasise the importance of the exploitation and exploration of organisational knowledge for the increase of competence and productivity.

### ***2.5.2. Change in organisational structure***

Recently, the focus of organisational restructuring has been on creating organisational forms which are designed to be flexible enough to adapt to a rapidly changing environment, but also on more effectively mobilising the organisational knowledge and competence distributed in the firm.

For large firms encountering environmental uncertainty and pressure, one of the critical challenges is how they can reconfigure their organisation in order to fit this changed environment. Contemporary large firms have, to a lesser or greater degree, a diversified business structure. They illustrate how multi-divisional forms of organisation can effectively manage varied business lines, although the internal composition of the forms may substantially vary from firm to firm according to

organisation-specific conditions. Organisational structure is one of the critical factors that determine corporate adaptability to environmental change, as it is likely to determine decision-making channels and the flow of information and knowledge within the firm. This is evident in Sharfman and Dean Jr. (1997), who argue that the most crucial factor in all organisational adaptation is the decision-making process.

Firms need an organisational structure that is adequate for effectively coping with unpredictability and instability in business environment. This is because, under turbulent economic conditions, firms have to be flexible enough to be capable of responding quickly to new pressures and demands (Kelemen, 1999). As one evidence that shows this tendency, the largest leading firms have tended to decentralise strategic decision-making by dividing it into sub-organisational units. The structure of organisation is to a degree associated with the capability to mobilise resources and competences within and without the firm (Marengo, 1995, cited in Amin and Cohendet, 1999). This aspect is important with regard to competitiveness and learning. In the long term, continuous adaptation can be sustained through a balanced coordination of continuous and discontinuous learning, which requires the timely and effective mobilisation of resources and competences. Firms that are capable of reorienting themselves to new adaptive landscapes have organisational forms which favour decentralisation and local autonomy, representing an internal diversity that is conducive to generating multiple bases learning processes (Levinthal, 1996; Teece *et al.*, 1997). Such forms of organisation enable firms to combine exploitation with exploration. Thus they may increase the possibility of learning and innovation based on cognitive diversity as well as the likelihood of adaptation, thanks to openness to outside worlds and the flexibility to adapt to changes.

### ***2.5.3. Strategic alliances***

Increasing international competition makes it difficult for individual firms to survive by themselves. In part, this is because market and technology have become more

complex and dynamic, and cannot be covered adequately with the internal capabilities of an individual firm. Firms seem to find it difficult to possess all the resources and knowledge needed to compete in a given market. Because of this, inter-firm alliances have been increasingly advocated as a way to sustain an individual firm's continuous survival and growth.

The nature of inter-firm alliances is becoming increasingly complex and multifaceted. The reasons for this include a difference in the motives and expectations of the firms which intend to forge alliances, and the variety of areas and forms of alliances. As shown in Table 2.3, strategic alliances are forged for a variety of purposes as well as in various areas, ranging from R&D to production and marketing. First, with reference to marketing, the aim of an alliance between MNCs is usually to either *penetrate local* markets or to intensify their market positioning. Some alliances in marketing are associated with national or supranational regulatory policies. The tendency of large firms to steer their business portfolio towards core competences leads to the increase in long-term contracts between market leaders in the form of mutual OEM in consumer goods. The corollary of this is that allied firms are not only able to maintain, or even expand, their market share, but also avoid the problems of overcapacity caused by market saturation or excessive facility investments.

Table 2.3 Purposes of inter-firm alliances by large firms

<i>Classification</i>	<i>Purposes</i>
<i>Marketing</i>	Penetrating market and intensifying market positioning Overcoming trade barrier Expanding market share via diversifying product portfolio via mutual OEM
<i>Production</i>	Realising economies of scale and scope Coping with overcapacity caused by market saturation or excessive facility investments → Monopolising global market by global market leaders Utilising comparative advantage between market leader and technology leader Reciprocal mutual sourcing on a stable basis (product vs. product; product vs. parts; parts vs. parts)
<i>Technology (R&amp;D)</i>	Learning and gaining complementary technological competences from counterpart Monopolising an emerging market via technological advancement Sharing costs, uncertainties, risks of R&D Leading global competition for preoccupying I industry standards (e.g. digital television, home network) Saving costs via cross licensing Utilising complementary assets between manufacturer and techno-based firms Coping with a rapidly increasing technological convergence via sharing complementary technological competences between allied firms

Sources: based on Dicken (1998), Gnyawali (1999), Hudson (2001), Powell (1998), Tidd *et al.* (1997)

Second, inter-firm alliances are largely forged for joint production. The aim of this is either to realise economies of scale and scope or to overcome the problems of overcapacity. In seeking cooperative relationships in production, joint ventures are a conventional form of alliance. On the other hand, firms tend to establish long-term supply relationships on a stable basis. In this process, interactive learning appears to

take place between customer firms and suppliers (Lundvall, 1988). In addition to alliances between manufacturers, there is a growing tendency that R&D-intensive firms make connection with manufacturers. The aim is to utilise the complementarity of core competences between firms that are specialised in different areas.

Third, technological collaborations are the most common in inter-firm alliances, particularly between technologically intensive firms (Hudson, 2001). Most of these technological collaborations tend to take place in the area of product development. Although there are a number of reasons for these collaborations, the common intentions of the firms include the sharing of costs and risks, the reduction of the time and uncertainties in the development of new product, technological learning and the monopolisation of markets. In this respect, learning is not the only reason for technological collaborations. However, strategic alliances can offer great opportunities to learn new skills and knowledge (Inkpen, 1996). The potential for learning and the success of technological collaborations are likely to rely, to a greater or lesser extent, on the complementarity and balance of technological competences between alliance partners, the degree of relational proximity between alliance firms and a firm's absorptive capacity based on a prior knowledge base (Child, 2001; Kraatz, 1998; Nooteboom, 2000; Tidd *et al.*, 1997).

#### ***2.5.4. Innovations in process and product***

Sustaining innovation in products and processes is important if firms are to adapt to intensifying competition. Firms deliberately seek to differentiate themselves from rivals through a variety of product and process innovations (Saviotti, 1997). In a given market, process innovation plays a role in increasing the flexibility of production as well as in reducing production costs. According to the theory of product life cycle, process innovations tend to take place mainly in a mature stage of product as an important factor for sustaining adaptation (Hudson, 2001). Examples of industries at the mature stage of a product life cycle include consumer electronics, chemicals and

steel, and firms in these industries compete for established product technologies. Therefore, the centrality of competition lies in the efficiency of production and the reduction in costs rather than in new product knowledge. In addition to this, process innovation tends to be more important for technology-follower firms attempting to sustain competitiveness (Kline, 1991). However, process innovation can also be critical for corporate competition in the high-tech industry.

Process innovation involves either the reorganisation of labour processes or the introduction of new production methods. An improvement in the production process is often the outcome of learning-by-doing and trial and error taking place in the manufacturing process. These processes of learning by manufacturing workers produce tacit knowledge in the form of know-how and skills, and the organisation's tacit knowledge is likely to lead to incremental innovations. However, this does not seem to be enough for firms to sustain continuous adaptation. Sometimes, firms need radical innovations in production processes such as the introduction of new production technologies or machines. The codified knowledge embodied in these should be adapted to specific organisational contexts. The process of innovation needs the combination of codified knowledge imported from the outside and tacit knowledge embedded in the organisation. Therefore, successful adaptation to the new ways of production may rely on the ability to settle new routines in the workplace by effectively bringing together both forms of knowledge.

In addition to process innovation, leading players strive for product innovation. This is to secure their competitive position by creating new markets beyond existing markets (Hudson, 2001). It is also a means to survive and adapt to intensified market competition and the change in consumer demand. Innovations in products are by and large incremental rather than radical, because most product innovations tend to take place within the scope of existing products. Rosenberg (1996) confirms this tendency by showing that more than 80% of industrial R&D expenditures are devoted to improving existing products. This means that the focus of R&D activities in industrial



firms is on 'Development' rather than 'Research' (Forbes and Wield, 2000). Industrial leaders in market and technology do not only strive to intensify their competitive position through incremental innovations, but also make great efforts to remain in the industrial leadership and to adapt to new competitive environments by sustaining radical innovations.

#### ***2.5.5. Organisational innovations***

Together with a change in organisational structure, organisational innovation is a crucial dimension of corporate restructuring. As Kenney and Florida (1993) argue, the organisational model has been shifting from a traditional Fordist organisational model to an innovation-mediated one (see Table 2.4).<sup>4</sup> The emerging forms of organisation encourage organisational innovation and learning. They suggest five basic dimensions of the innovation-mediated model: a transition from physical skill and manual labour to intellectual capabilities or mental labour; the increasing importance of social or collective intelligence as opposed to individual knowledge and skill; an acceleration of the pace of technological innovation; the increasing importance of continuous process improvement on the factory floor and constant revolutions in production; the blurring of the lines between the R&D laboratory and the factory (p. 14). This does not mean that workers are simply a given factor in production. Rather, they are considered to be an integral part of a learning economy, which focuses upon functional flexibility rather than numerical flexibility (Ettlinger, 2000).

Thus, innovation-mediated production integrates the knowledge and intelligence of all workers, from R&D scientists and engineers who create new technologies and product ideas to shop-floor workers who turn those innovations into marketable products (Kenney and Florida, 1993: 15). Therefore, the conceptual starting point of innovation-mediated production comes down to the question of how firms sustain

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<sup>4</sup> An alternative organisational model by Kenney and Florida is also, as with other writers stressing new competitive organisational forms, inspired by the characteristics of organisational forms and behaviours which highly innovative Japanese manufacturing firms have adopted.

learning and adaptation by harnessing and organising the intelligence, skill and knowledge of organisational members. Such capabilities to learn and adapt can be realised by establishing an organisational form which is pro-active, flexible and open-minded.

It has been argued that traditional forms of organisation have become obsolescent, as they have revealed their limitation in coping with a rapidly changing environment. Firms have thus faced the challenge to move towards more decentralised and networked organisational forms away from hierarchical and concentrated ones (Cooke and Morgan, 1998; Hedlund, 1994; Levinthal, 1996). Evolutionary and competence-based theories of the firm are helpful in explaining the changing features of organisational forms that contemporary large firms face. A theoretical framework of these views emphasises the capabilities of firms to mobilise the knowledge distributed inside and outside the firm, as well as to sustain collective learning as the most crucial strategic asset. In view of this, it is critical to reset the boundaries of the demarcated divisions of labour between organisational units, in order to foster interactive learning between distributed units or subgroups. To do this, Cooke and Morgan (1998) stress the need to consider the role of peripheral organisations such as branches and subsidiaries, the responsibility of work teams, local autonomy, the link between R&D and production, and the importance of suppliers.

Under the Fordist mass production regime, typical organisation forms consist of highly segmented divisions of labour, characterised by task specialisation, functional fragmentation, and hierarchical management control. The realisation of mass production based on the maximisation of cost effectiveness is the basic concern. This means that the underlying principle lies in maximising the efficiency of formalised routines. Vertical control based on hierarchy is a principled way of managing the organisation. Therefore, non-managerial units such as R&D and production have little authority to make a decision. The model also emphasises the vertical flow of information that is well reflected in the linear process of innovation. Thus it has no

space for accepting cognitive diversity and multiple voices. Daily work practices are carried out on the basis of officially defined relationships. All of those aspects result in the limitation to the possibilities for members of the firm to interact and communicate. In addition, this model is based on simple adaptive responses to environmental change. As a result, firms have great difficulties in sustaining adaptation and learning in the context of a rapidly changing environment and market competition.

In contrast, an innovation-mediated organisational model is designed to increase the degree of innovation and collective learning to sustain and secure high quality and productivity. This model differs significantly from the Fordist model of organisation in the organising and managing of the divisions of labour among teams, departments, functions or individual workers. It stresses that learning and knowledge creation are the responsibility of everyone in the organisation, not just a selected few such as R&D engineers and managerial groups (Nonaka and Takeuchi, 1995). The shared divisions of labour are characterised by functional fluidity and boundary blurring, with the intention to increase the capabilities to solve problems, learn, innovate and adapt. This overlap and the crossing of functional boundaries foster collective learning based on learning-by-interacting (Morgan, 1996). Work practices are designed to encourage workers to learn and innovate through learning-by-interacting, learning-by-doing and learning-in-doing, drawing upon interactive participation and communication.

Table 2.4 A comparison between organisational models

	<i>Traditional form</i>	<i>Innovation-oriented form</i>
<i>Focus</i>	Control and efficiency Efficiency of mass production with low cost	Learning and coordination Collective learning for high quality and productivity
<i>Decision making structure</i>	Vertical and hierarchical control Non-managerial groups having little authority to make a decision	Convergence and co-ordination of local voices Local autonomy and responsibility
<i>Division of labour and work form</i>	Highly specialised division of labour Specialised functional boundaries Separation of conception and execution Work practices based on officially defined relationships	Shared division of labour Functional fluidity and boundary blurring Integration of conception and execution Work practices based on both formally and informally constructed relationships Collective task through team work promoting job rotation and the career cycle of workers
<i>Link between R&amp;D and production</i>	Functional separation of R&D and production Based on the linear innovation model Proximities not considered Fixing independent routines between divisions	Organic link between R&D and production Based on the interactive innovation model Highlighting spatial and organisational proximities Job rotation and the exchange of workers
<i>Implications for learning and adaptation</i>	WEAK forms of organisation in the context of radically changing hyper-competitive environment Stressing vertical flow of information Leading adaptive response and substantive rationality Low capability to solve problems Low possibility of interaction and communication Low degree of organisational proximity Ignorance of cognitive diversity	STRONG forms of organisation in the context of radically changing hyper-competitive environment Stressing contextualised skill and knowledge, collective learning and multi-lateral knowledge transfer and diffusion Leading innovative behaviour and procedural and recursive rationality Fostering chances to interact and communicate between workers across functions in both formal and informal ways, based on organisational proximity Activating communities of practice Acknowledgement of cognitive diversity

Source: Author's construction based on Kenney and Florida (1993) and Lam (1994; 1996)

In addition, this model emphasises boundary blurring between conception and execution. This is inspired by the recognition that organisational forms designed to adapt to hyper-competitive environments must be capable of integrating the knowledge and intelligence of all workers. Excessive functional specialisation leads to a separation between technical and organisational knowledge and thus brings about a variety of problems in the coordination between functions and in knowledge management.

Therefore, it is argued that the functional link between R&D and downstream functions is important to effectively combine the abstract scientific and technical knowledge of R&D workers, which is embodied in innovations and saleable commodities, and the knowledge of shop-floor workers, which provides a crucial source of product and process improvements (Kenney and Florida, 1993). This argument is clearly reflected in Lam (1996) who studied Japanese firms:

Engineers involved in the project are expected to interact on a continuous basis, share information and responsibility. The overlapping approach makes a narrow division of labour ineffective. The fluidity and ambiguity of job boundaries mean that R & D engineers are sometimes expected to play a technical support role in production or to be a market researcher if necessary. Project members are expected to reach out across boundaries, to engage in intensive information transfer and to acquire a breadth of knowledge and skills. This is especially evident when engineers are engaged in new product development (p. 192).

As a means to realise such functional integration, geographers emphasise the need for co-location between R&D and manufacturing (see Cooke and Morgan, 1998, Morgan, 2001, Hayter, 1996). For them, the geographical clustering of R&D and manufacturing can contribute to improving the potential for learning and innovation because it allows employees across different job boundaries to interact on a face-to-face basis.

Training methods, such as job rotation and the exchange of workers between functional divisions, are also critical dimensions in sustaining organisational innovation. By

taking part in these, it is believed that workers can gain contextual skills and knowledge about organisational routines and management processes. Contextual skills and knowledge are referred to as general capacities for co-ordination and information processing (Aoki, 1988, quoted in Lam, 1996), and these enable engineers to cope with emergent tasks and unusual problems (Campbell and Warner, 1992).<sup>5</sup> Such skills and knowledge are considered to be composed of competence bases that are critical for adapting to a rapidly changing technological and product market environments.

In addition, job rotation and the career cycle of R&D engineers can be a helpful means of incorporating formal and tacit knowledge. It is widely accepted that job rotation plays a role in broadening the skills and knowledge base of engineers as well as facilitating information and knowledge flow across different functions. In part, this practice between different teams, subgroups or departments is likely to improve relational/organisational proximity between heterogeneous groups within the firm, as there is the possibility that it will create personal networks which will in turn facilitate learning.

## ***2.6. Linking a learning perspective and a restructuring perspective***

A competence-based learning perspective offers a useful framework for an understanding of not only why firms differ in adaptation and evolution but also of how the firm learn and adapt to both incremental and radical change. Learning is based on processes of knowledge not only both within and beyond the firm boundary but also existing in both tacit and explicit forms. Thus learning constitutes the basis of firm competences. Meanwhile, competences or routines based on such processes of learning appear to make it difficult for a firm to sustain strategic learning to adapt to radical change. However, this competence-based view, despite its rich implications for

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<sup>5</sup> However, it is also hard to completely defy the contention that what is involved in emerging new forms of organisation is not multi-skilling but multi-tasking, part of a search for new ways of intensifying the labour process (Hudson, 1997).

the dynamics of the firm, does not explain the sources of learning and the social processes of learning taking place both in and out of the firm. Considering processes of mobilising various forms of knowledge and processes of learning, a sociological understanding of learning communities is of critical importance.

In addition, it is problematic that a competence-based learning perspective is little to say about the specific processes of firm strategies taken in response to radical change. A learning perspective tends to draw too much attention to incremental learning. In contrast, a restructuring perspective offers a useful framework for making sense of the processes and mechanisms of adaptation to radical change in the real world. Corporate restructuring involves various dimensions of organisational change and adaptation. Although these restructuring measures aim at the transformation of organisational structure and strategy, processes of restructuring also involve learning processes. In this sense, restructuring strategies help to understand various sorts of learning strategy.

Nevertheless, it is not that this is without flaws. This view also does not show firm-specific processes of adaptation. In other words, this view does not explain why in an identical situation some firms take a certain strategy, while why others do not so; why firms take different strategies; and why such strategies result in different outcomes between firms. In addition, this view does not interest how social processes of learning and organisational competences contribute to the implementation and outcomes of firm strategy. In this sense, a learning perspective provides a context-specific explanation of corporate adaptation. Therefore, corporate adaptation could be better understood by combining both theoretical positions.

## ***2.7. Conclusions***

This chapter has attempted to conceptualise corporate adaptation by drawing on theoretical perspectives on learning, restructuring and ‘learning communities’ in the

firm. I have tried to show throughout the chapter that corporate adaptation cannot be reduced to limited aspects of learning or organisational change. Instead, I have emphasised that adaptation involves multiple processes of organisational responses to environmental change. Whether a firm is capable of adapting to changes seems largely dependent on both the process and outcome of organisational change, both strategic and non-strategic actions, and both internal structure of governance and external environments.

I have argued that incremental learning, drawing on tacit knowledge, cannot adapt to environmental discontinuity. This is likely to make established routines obsolete, as routines that are seen as core competences imply path-dependent learning, when different modes of learning are required in order to fit a new environment. In this case, core competences turn into core rigidity and thereby result in a state of lock-in. A radical change in environment requires firms to learn to adapt. As argued by Amin and Cohendet (1999), learning to adapt presents a greater challenge to firms than does competence-based incremental learning as it involves a management's ability to perceive and anticipate changes in the surrounding environmental conditions as well as requiring an unlearning process. It also means not only combining tacit knowledge and codified knowledge, but also mobilising internal knowledge and external knowledge. It does not mean, however, that radical learning does not need the knowledge accumulated within the firm or to specialise in the acquisition of formal knowledge. Various forms of organisational knowledge serve as absorptive capacity, which is crucial to learning new knowledge. In addition, learning, especially radical learning requires that tacit knowledge and explicit knowledge are brought together. As a result, a crucial challenge for firms to adapt to radical changes is to not specialise in any one type of learning, but to sustain a balanced combination of incremental (single-loop) and radical (double-loop) learning.

I have also argued that in the real world, corporate adaptation is sustained through both learning and restructuring. Understanding the processes of corporate restructuring



offers useful insights into what is required to sustain continuous adaptation. At first, some of the restructuring processes, such as downsizing, employment adjustment, and the replacement of top managers, are conducive to forgetting (unlearning) existing routines and sustaining discontinuous learning. Technological and organisational innovations on a continual basis are recognised as extremely crucial for firms to adapt to increases in inter-firm competition and the complexity of technologies. At the same time, firms need to make use of strategic alliances in order to access and gain the sources of knowledge external to the firm as well as to jointly cope with changes in market and technology. All these processes involve learning processes.

Finally, I have suggested that communities in the firm can be vital sources of learning and play a critical role in sustaining both incremental and radical learning in the process of their own problem-solving activities. In spite of their different goals and organising processes, they mobilise distributed knowledge and competences as well as blend the varied forms of knowledge in their own way. Although three kinds of communities in the firm are said to be conducive to both incremental and routine-breaking learning, each has a different potential for learning. Communities of practice seem to contribute to intensifying incremental learning, while epistemic communities seem to play an important role in achieving strategic learning on a longer-term basis. Meanwhile, task-force teams can be a critical player in the strategic production of knowledge and in problem-solving on a shorter-term basis. However, the important point is that incremental and radical learning by firms can be achieved through organising various forms of learning communities. This means that in response to radical environmental change, firms attempt to sustain both incremental and radical learning by taking advantage of these communities.

In the following chapter, the issue of learning relating to space and place is explored, questioning the existing understanding in economic geography on learning and proximity.

## Chapter 3

### Theorising geographies of learning

#### *3.1. Introduction*

In recent years, economic geographers have paid much attention to the region as a key source of learning for creating organisational knowledge and competences. Their argument stems from the assumption that tacit knowledge is spatially sticky and that geographical proximity is, accordingly, central to access and acquire such tacit knowledge. It follows that learning should centre on geographical proximity. However, the geographical literature on learning tends to over-stress the advantage of localised learning in firm competitiveness and the power of geographical proximity in learning. It lacks the consideration of how learning takes place in the firm and where the sources of knowledge and learning come from. There is a danger that this tendency may misconstrue the nature of learning which takes place in the firm and overstate the power of geographical proximity and the region as a source of learning.

As explained in the previous chapter, the recognition of learning as a social, interactive process implies that learning needs not rely necessarily on geographical proximity, but on the characteristics of relational and organisational proximity that bind agents involved in learning processes together. But learning also influences an ability to mobilise decentralised knowledge and resources. The purpose of this chapter is to challenge the received wisdom in economic geography and propose a different point of view on the source of learning. It suggests that a relational/organisational perspective offers a critical insight into exploring the sources of learning and how learning occurs and is realised in the firm.

The first section critically reviews the geographical literature on learning and proximity.

Then, I attempt to conceptualise a relational/organisational perspective on the sources of knowledge and learning in the firm, by drawing on theories of the firm and organisational learning. To do this, the concept of proximity is elaborated in order to grasp the nature of learning and its processes. The main point I make is that geographical proximity alone is not sufficient for understanding the nature of learning and thereby the centrality of proximity in learning should be studied along relational/organisational dimensions that go beyond geographical proximity. This recognition leads us to take a closer look at the sources and processes of learning.

In the last part of the chapter, I attempt to rebuild the relationship between learning and proximity, by drawing on such concepts as 'ba', communities of practice, epistemic communities and task-force teams. In doing this, I try to show how such communities in the firm seek to sustain learning by creating relational/organisational proximity and taking advantage of geographical proximity. The final section suggests that the increasing tendency of corporate restructuring characterised by the globalisation of R&D and strategic alliances implies that corporate learning takes place within and beyond the boundaries of the firm.

### ***3.2. A critical perspective on geographies of learning and proximity***

Regions are becoming focal points for knowledge creation and learning in the new global, knowledge-intensive, capitalism. In effect, they are becoming learning regions. These learning regions function as collectors and repositories of knowledge and ideas, and provide the underlying environment or infrastructure which facilitates the flow of knowledge, ideas and learning (Florida, 1998: 19).

Inspired by the emergence of the learning or knowledge economy paradigm (Burton-Jones, 1999; Foray and Lundvall, 1996; Lundvall, 1996), the region has, in recent years, re-appeared in the interest of economic geographers (see, for example, Cooke and Morgan, 1998; Ettlinger, 2000; Maskell, 1999; Maskell and Malmberg, 1999a, 1999b;

Storper, 1997). The literature on learning in economic geography stresses that the region is a repository of knowledge assets, mostly tacit, which are critical to maintaining a firm's competitiveness. In other words, the key to corporate success lies in how to best access, disseminate and internalise such tacit knowledge within the organisation. The argument is that since tacit knowledge is spatially sticky, it follows that it can be best accessed, learned and finally mastered on the basis of face-to-face interactions on a local or regional scale. In the end, it sees geographical proximity as a crucial dimension in effectively learning such tacit knowledge (Maskell and Malmberg, 1999a; 1999b; Morgan, 2001).

Geographers often take remarkable examples of advanced industrial districts, such as Silicon Valley, Baden-Württemberg and the Italian industrial districts, in order to justify the role of geographical proximity in learning tacit knowledge. The competitiveness of such regions is driven by localised learning and innovative capabilities based on 'relational assets' and 'untraded interdependencies' (Amin and Thrift, 1997; Cooke and Morgan, 1998; Storper, 1997). This highlights that relational assets, which involve local common cultural and behavioural norms incrementally created by trust and reciprocity between local institutional agents, play a fundamental role in governing the social economies of the region.

It is argued that the source of competitiveness in such regions lies in the place-specific institutional mechanisms of learning, characterised by the ability to sustain flexible adaptation to environmental changes or even reflexive reorganisation. These may be the characteristics of places showing 'best practices' in a global economy. They are often called 'learning regions' (Florida, 1995, 1998; Morgan, 1997), reflecting the distinction between such regions and Fordist mass production regions.<sup>6</sup> Firms in learning regions that are replete with the assets which support innovation and learning – information, knowledge, technology, ideas, training, and skills – gain dynamic

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<sup>6</sup> According to Florida (1998), while Fordist mass production regions represent those based on comparative advantage that is generated by factors such as natural resources and cheap labour cost, 'learning region' is possible in case that a region's competitive advantage is driven by knowledge creation and continuous improvement.

efficiency through the access they enjoy through networks of interdependence with other firms, formal institutions of learning, and common conventions and understandings that surround firms (Amin and Cohendet, 1999a: 89).

Geographical proximity is regarded as critical for accessing localised relational assets as well as fostering untraded interdependencies. Harrington *et al.* (1999) argue that geographical proximity between firms, especially when engaged in industrial sectors relying on specialised information or skill or rapidly changing innovations, facilitates the frequent interaction, both formal and informal, that engenders the social virtues of trust, co-operation, and exchange of information (tacit and explicit) necessary for success. Of course, the possibility has been acknowledged that this logic can only apply when the region shares the strength of its 'untraded and traded interdependencies' between local economic institutions and has a richness of valuable (tacit) knowledge (Hudson, 1999; Malecki, 2000; Storper, 1997).

However, the reasoning behind these arguments can be questioned. Contemporary firms operate under pressure to cope with rapid changes in markets and technology. These competitive environments require firms to learn and adapt better than competitors (Kanter, 1989; Thrift, 1996). They force them to use any kind of knowledge, to make any kind of alliances and to go to any region, as far as they can. Nevertheless, the recent geographical literature on learning and innovation tends to overstate the power of geographical proximity and the region as a source of learning (see, for example, Asheim, 1999; Braczyk, Heidenreich and Cooke, 1998; Keeble and Wilkinson, 1999; Malmberg and Maskell, 1997; Maskell and Malmberg, 1999a; Simmie, 1997).<sup>7</sup> Moreover, it lacks hard empirical evidence as to *how firms learn*. As pointed out by Glasmeier and Fuellhart (1996):

Research and writing on firm learning primarily emphasize either the internal or

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<sup>7</sup> However, most studies of 'learning organisations' and 'organisational learning' also have the same problem as the literature on regional learning, by primarily focusing on the organisational context of learning, with little attention to the societal and spatial context.

external environment of a firm. Far less attention is paid to the intersection between the two – that is, the processes by which changes in the external environment are recognized, identified, and internalised by the firm in a way that maintains or even increases competitive position. Although geographers, planners, and regional economists have explored this intersection, there has been a tendency to reduce the problem to either (a) descriptions of archetypal situations in which it is presumed that firms learn through proximity, and therefore firms found in proximity to one another have a higher propensity to learn; or (b) a highly abstract theoretical discourse that renders conceptual operationalization impractical.

In the same context, Oinas (1999) also claims that the geographical literature on learning lacks research on actual learning processes to prove whether learning is localised or takes place in a corporate hierarchy or anywhere else. This illustrates that there is a need for more scrutiny on the perspective that stresses the advantage of localised learning. Let us assume that it is the case that firms operating in a certain place are more competitive. If so, is this the result of learning local tacit knowledge? Is such local tacit knowledge composed of strategic assets which enable local firms to obtain competitive advantage? Can tacit knowledge secure the competitiveness of firms in an era of technological complexity and environmental uncertainty?

However, there is a growing literature arguing that, in this era, local tacit knowledge and incremental learning are no longer sufficient for securing a firm's competitive survival. According to Amin and Cohendet (1999a), business networks that are largely dependent on local tacit knowledge and incremental learning may prove to be inadaptable in the face of radical shift in markets and technologies. They assert that, especially for globalised large firms, the key problem is not so much how to acquire localised tacit knowledge or specialise in one form of knowledge, but rather how to mobilise and integrate distributed forms of knowledge whether tacit or codified. The question raised by Amin and Cohendet is convincingly supported by some case studies. Sternberg and Arndt (2000) investigated the influences of the region on firms' performance and capacity of innovation. According to the study, large firms in industrial clusters have little to do with the region in the way of learning and innovation behaviour, and even small firms in high-tech industrial clusters dominated by a handful

of large firms are little influenced by regional factors.

Oinas (1999) also insists that firms tend to show a strong connection with knowledge sources outside the local in order to sustain learning and innovation. As firms tend to strategically make a huge effort to avoid leaking out critical knowledge and competences, localised sources of knowledge are likely to be non-strategic assets that could be partly helpful in incremental innovations. Similarly, Amin (2001a) stresses that geographical proximity does not imply association and interaction, as access to the sources of knowledge depends on the capability of the firm to mobilise a variety of contact networks in order to establish economic links with other firms, markets, and institutions located elsewhere nationally and internationally. Reliance on face-to-face contact and local knowledge for market opportunities may progressively decrease, once firms sustain the routinisation of local proximity into relational and institutional proximity, through corporate and associational belonging and cultural enrolment, and through visibility, trust and emotional closeness enabled by virtual and transport connectivity.

A survey by Jones (2000) on the effect of local networking on the innovative performances of firms in London questions the tendency of research which argues the advantage and potential of localised interactive learning between local firms. The survey convincingly suggests that regions, in particular large cities, should be seen less as networking mediators for the localised learning of tacit knowledge than as nodes to access business services such as administrative and legal services and financial institutions; formal institutions or facilities for industrial activities such as R&D centres and business training institutes; a multiple-layered labour market pool from technicians to R&D engineers.

Coincidentally, Glasmeier and Fuellhart (1996) also argue that, while agglomeration economies certainly promote incremental or routine learning, their impact on strategic or non-routine learning is less clear, because it might be hypothesised that truly strategic

learning results more from a hierarchical diffusion of knowledge that transcends the local. Cohendet *et al.* (1999) go so far as to suggest a convergence between localised and globalised networks of learning, by showing that in contrast to claims asserting the superiority of local tacit knowledge, large multi-locational firms are capable of perfectly combining codified and tacit knowledge by developing IT-based communication systems that enable them to integrate localised competences into a frame of interactive learning.

These theoretical and empirical studies all dissent from the current trend in geographical literature by questioning the power of geographical proximity and the region as a source of learning. These are signals for notifying that it is time to reconsider the role of proximity and place in corporate learning to avoid a possible error through geographical hyperbolism which such logical reductionism may result in. However, this is not to say that learning has nothing to do with space and place. As proved in a variety of studies, certain places, replete with the sources of knowledge, provide clustered firms with heightened opportunities to learn. Geographical proximity can also be, to a greater or lesser extent, helpful in accessing the regional sources of learning.

In a nutshell, the important point is that geographical proximity itself does not guarantee that learning processes are initiated and made. Learning is not given and does not lead to a uniform outcome. Rather, learning is initiated and realised through complex and multi-faceted organisational processes across space, beyond a restricted place. Corporate learning is the product of complex human relationships and social interactions surrounding firms. The effectiveness of learning is likely to depend on the quality of social interactions, the nature of learning itself and the nature of ties among agents, regardless of whether it is collective or individual. Therefore, it is right to see that geographical proximity is only one aspect of factors that influence wider socio-cultural and institutional processes, which surround organisational learning. Understanding the process and mechanism of learning needs to start from unravelling the corporate contexts in which learning takes place. The following section attempts



to conceptualise the concept of proximity, with focusing on relational and organisational dimensions.

### ***3.3. Learning and proximity: a relational/organisational perspective***

#### ***3.3.1. Understanding the concept of proximity relationally***

By definition, the term ‘proximity’ is referred to as the state of being close or near when describing a relation between agents. Nevertheless, it would be wrong to see this term as indicating simply the spatial. The concept of proximity encompasses multi-dimensional aspects that mediate and influence learning between agents. Agents and groups may be close not only territorially, but also relationally, organisationally, institutionally and so on. Proximity should thus signify much less the spatial interactions *per se* than the mix of situated culture and institutions that characterises the context and facilitates communication, cumulative informative exchange and learning (de la Mothe and Paquet, 1998). In this context, proximity is seen as defining the web of complex human relationships and social interactions. If we recognise that learning reflects the dynamic process of social interaction, the focus should lie on examining such a process. In other words, it should highlight the role of relational dimensions in learning.

As mentioned above, corporate learning involves complex social interactions between individuals, and across functional boundaries or a firm’s boundary. Relational proximity refers to the nature of the relationship between individuals, members of a group, or groups. This can be sustained through common language and culture, mutual trust, mutually respected norms of behaviour. Thus, the extent to which agents are proximate relationally seems to relate to the creation of social capital. The concept of relational proximity involves not only informal relationships between individuals, such as informal networks, but also formal relationships between agents who belong to

a purposeful organisation. Meanwhile, the concept of 'organisational proximity' is referred to as a coordination mechanism that binds together individuals engaged in a purposive activity (Blanc and Sierra, 1999). Thus, firms try to establish common codes of coordination and communication to facilitate social interactions, while avoiding the possibility of mismatch or conflicts in communications between members. Conventionally, organisational proximity applies to intra-firm relationships. But organisational proximity is required to coordinate inter-firm relationships, such as user-producer relations (Blanc and Sierra, 1999). In what follows, I attempt to elaborate relational/organisational proximity through the concepts of cultural proximity and cognitive proximity.

### *3.3.2. Cultural and cognitive proximity*

Organisational proximity can be facilitated when organisational members share common cultural attributes. Therefore, cultural proximity is regarded as crucial to sustaining organisational proximity. The term 'culture' refers to the conventional ways of doing things among people or within an organisation, and is shaped by the way people share common norms, values, language and understanding over time. Culture is created at multiple levels, from the small group to organisation or society, and beyond, and levels usually overlap. Cultural proximity provides members of organisation with a common perspective. Thus cultural proximity plays a role in increasing common understanding among members. This is not only important for facilitating collective learning with methods such as informal dialogue and interactive communication, but is also conducive to improving the capacity to solve certain problems faced by organisations.

Of course, the benefits of cultural proximity might be promoted by maintaining geographical proximity between agents. Meanwhile, long-term co-location between agents is likely to increase the potential for sharing cultural proximity between them. Both dimensions of proximity would thus be complementary. Let us suppose a case

where two agents are geographically separated from one another, but share the same culture at the organisational or national level (e.g. Chinese overseas business networks). Thanks to a sense of common understanding and inclusion between agents, they can continue to manage their relationship and sustain problem-solving, learning and adaptation more effectively, partly with the help of virtual proximity via cutting-edge telecommunication methods such as e-mail and teleconferencing.<sup>8</sup> However, this does not seem sufficient. The degree of interactions and common-understanding appear to be, to a greater or lesser extent, limited by geographical proximity. As recently argued by Asheim (2000), social capital that is incrementally produced from mutual trust and the sharedness of norm, common belief and culture, and required to maintain long-term reciprocal and synergetic relationships, may, to a large extent, be built through close relations based on direct interactions and communications.

The cultural approach to proximity helps us to understand how organisations or communities within the firm gain relational/organisational proximity, while the cognitive approach to proximity also offers an insight into ways of achieving a balance between sustaining organisational ties for a unity and allowing novelty or radical innovation. The concept of cognitive proximity in the study of learning and innovation has been influenced by a Neo-Schumpeterian perspective. This perspective stresses that variety (or diversity) can play a crucial role in creating the learning and innovation needed for sustaining the dynamic evolution of the firm (Metcalf, 1998; Saviotti, 1996). It emphasises the role of cognitive and behavioural diversity in improving the learning capability. The term 'cognition' refers to the mental action or process of acquiring knowledge through thought, experience, and the senses (Hayes and Allison, 1998). Nooteboom (1999a, 1999b, 2000) introduces cognitive proximity as a means of explaining the dimension of learning and innovation in the relationships between inter-firm alliance partners.

The concept of cognitive proximity is the opposite to that of cognitive distance. This

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<sup>8</sup> Virtual proximity refers to situations which employ technology to either simulate or approximate spatial and cultural proximity.

conception helps us to understand the ways in which the cognitive distinction between agents affects performance in learning and innovation. It emphasises that the more cognitive distance between agents, the more possibility there is of creating novelty or creative destruction. That is because cognitive distance is more likely to provide the opportunity for agents to access fundamentally new ideas and insights from other sources. At the same time, the less cognitive distance there is, the more the possibility to generate new insights and knowledge is constrained.

There is a similar point of view on the benefit of cognitive distance, which states that agents have distinct cognitive structures while sharing cultural proximity, the potential for organisations to improve learning and problem-solving capabilities by mobilising cognitive diversity may be increased. If agents are culturally close to one another, there is the possibility that they will share a similar structure of cognition and perception. Cognition tends to be contingent upon interpretative contexts between people, but it may be more or less similar according to cultural proximity, which involves shared language, culture and experience (Nooteboom, 1999a). Conversely, cognitive proximity is not necessarily similar between people who share cultural proximity. Nevertheless, differences in the rationality of cognition and behaviour among people or sub-groups can, to a degree, be co-ordinated and governed by cultural proximity.

In sum, cultural and cognitive proximity between members allows in-depth, two-way communication and encourages the exchange and sharing of information and knowledge by drawing on trust, common understanding and sense-making. Therefore, it facilitates continuous learning and incremental innovations within a given framework. Meanwhile, there is the danger that a common cultural and cognitive identity may prevent a firm or a group from adapting to radical changes in the environment, by preventing it from taking up creative ideas and considering different points of view. In this context, the crucial point for continuous adaptation is a firm's capability to manage organisational proximity and mobilise cognitively distant agents in order to create

novelty. In the following sections, I explore how learning and knowledge creation take place in the firm by analysing proximities along a relational/organisational dimension.

### ***3.3.3. 'Ba' as relationally defined spaces of knowledge creation and learning***

The previous discussion shows that different forms of proximity are, to a greater or lesser degree, interwoven in the framework of relational/organisational proximity. The combined recognition of cultural and cognitive proximity in learning enables us to recognise the importance of relational/organisational proximity, when conceiving learning as a social and interactive process. This dimension of proximity seems to be promoted, or influenced, in part by the dimension of geographical proximity.

Nonaka and Takeuchi's (1995) model of knowledge conversion gives a fascinating illustration of how these forms of proximity are interwoven. Their model is concerned with theorising intra-firm learning processes, centred on the process of knowledge creation. They see that tacit knowledge in and out of the firm can be a basic element in promoting corporate competence and competitiveness. The key point of the model is how such competitive knowledge is socialised (tacit to tacit), externalised (tacit to codified), combined (codified to codified) and internalised (codified to tacit) within an organisational boundary, and how this cycle of knowledge conversion is repeated through a feedback process. It is argued that tacit knowledge can only be acquired through interactions between individuals. Thus the process of learning consists of a series of learning processes through direct observation, imitation, practice and hands-on correction on the basis of face-to-face contact. This process highly relies on how people or organisations form relational ties and maintain reciprocal relationships. Therefore, building a milieu of trust and mutual engagement among agents is a precondition. In this context, geographical proximity is viewed as a partial support for reproducing and reinforcing such a milieu.

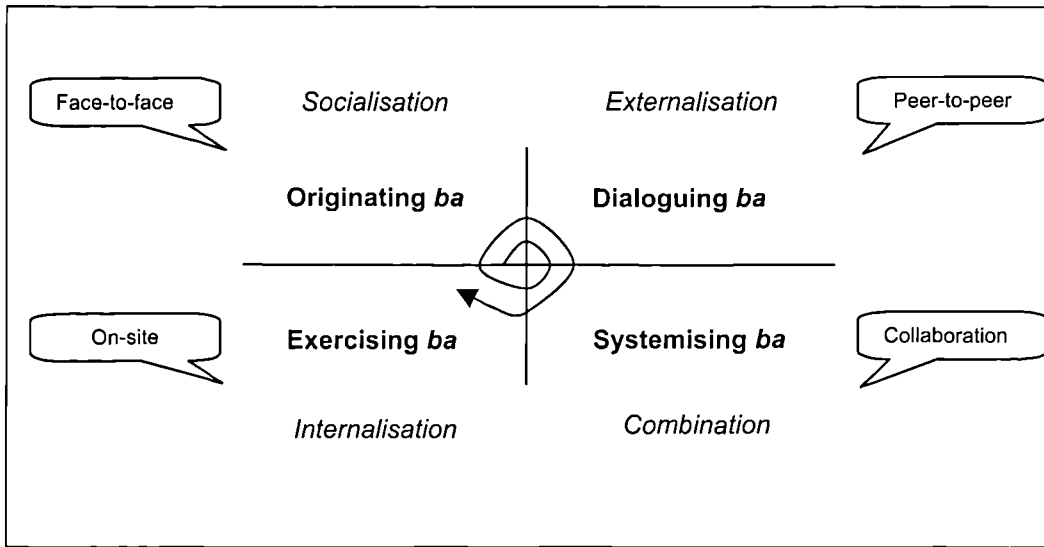
Going one step further, Nonaka and his Japanese colleagues have attempted to elaborate

on the learning process of organisational knowledge, drawing upon the concept of '*ba*' (Nonaka and Konno, 1998; Nonaka and Toyama and Konno, 2001). I suggest that this concept is very helpful in defining the relationship between proximity and learning. The Japanese word '*ba*' roughly means 'place' in English, but necessarily goes beyond what place implies. The concept of '*ba*' is defined as a *shared space* where learning takes place. It can be a physical space (e.g. an office or dispersed business space), a virtual space (e.g. e-mail and teleconference), a mental space (e.g. shared experiences and ideas), or any combination of them. This definition of '*ba*' shows that a key to forming '*ba*' is 'interaction', which is considered to be influential in the process and outcome of learning. As Nonaka, Toyama and Konno (2001) put it:

*Ba* is the context shared by those who interact with each other and, via such interactions, those who participate in *ba* and the context itself evolve through self-transcendence to create knowledge (p.22).

They subsequently try to explain the processes of knowledge creation and learning, drawing on four types of '*ba*' or knowledge spaces (*ibid.*: 24-26). The first, 'originating *ba*', is the place where individuals share feelings, emotions, experiences, and mental models, and is a knowledge space where the 'socialisation process (tacit to tacit knowledge)' takes place. Thus, the key to knowledge creation is physical, face-to-face interaction. The second, 'dialogue *ba*', is the place where individuals' mental models and skills are converted into common terms and concepts. 'Dialogue *ba*' corresponds to the 'externalisation process', which occurs in the codification of knowledge. Therefore, the sharing and articulation of knowledge through dialogue between participants, and the further articulation through reflection are critical. This implies that 'dialogue *ba*' seems likely to be effectively sustained when the organisation deliberately creates 'knowledge communities', such as project teams, strategic communities, or cross-functional teams.

Figure 3.1 Four kinds of knowledge spaces and knowledge creating process



Source: adapted from Nonaka, Toyama and Konno (2001).

The third, ‘systemising *ba*’, is a virtual place rather than real time and space. It offers a context for the ‘combination process’, by which new systemic, explicit knowledge is created through the combination of various elements of explicit knowledge. This type of *ba* is largely supported by the utilisation of ICTs (Information & Communication Technologies), such as on-line networks, databanks, documentation and groupware. The last, ‘exercising *ba*’, is a place where ‘internalisation’ takes place. Continuous learning and self-refinement through on-the-job training or peripheral and active participation facilitate the conversion of codified knowledge into tacit knowledge.

The concept of *ba* signifies that spaces of learning exist in any form of place where social interactions for learning take place. It goes beyond a physical space. It directly connotes the power of relational/organisational proximity. To a degree, relational/organisational proximity can be sustained at a distance with the help of ICTs methods such as e-mail, telephone and teleconferencing. However, it is not to say that geographical proximity is not important in learning. Rather, I would stress that geographical proximity can be a useful means of gaining “rich” relational/organisational proximity. The effective combination of different forms of proximity may enable the people involved to better understand, make sense of and learn from one another in

mutual and recursive ways. Nevertheless, it should be noted that geographical proximity without relational/organisational proximity is like an empty bowl. The interpretation of the relationship between proximity and learning, discussed throughout this section, emphasises the social and interactive nature of the learning, which takes place in the firm.

The last section deals with a matter of proximity in learning through communities in the firm. Particular emphasis is given to how communities in the firm create and develop relational/organisational proximity through space and place in organising their own activities.

### ***3.4. Communities in the firm, learning and proximity***

#### ***3.4.1. Communities of practice, epistemic communities and proximity***

The recursive process of learning in communities of practice can be enriched by the concept of proximity. Communities of practice appear to be a homogeneous group that is composed of people who share common practices with similar cultural and cognitive proximities. Etienne Wenger (1998) refers to the role of *geographical proximity on learning in doing*:

People who have related backgrounds are capable of creating a community of practice with less mutual engagement. If they are geographically proximate to one another, potential of learning may be further increased (p. 130).

There is no doubt that geographical proximity is, to some extent, conducive to the creation of mutual engagement between members of the community, especially at the early stage of its formation. However, it needs to avoid seeing geographical proximity as either a sufficient condition or a requisite for steering communities of practice. The



process of building soft infrastructures in communities of practice, indicating mutual engagement, joint enterprise and shared repertoire clearly shows how communities of practice obtain organisational proximity. The increase of mutual engagement through doing things together and mutual relationships may further lead participants to promote relational/organisational proximity. The process of learning that occurs through ongoing practice and draws on social energy and power generated through interaction in joint enterprises between participants leads to the formation of a local code of practice and a regime of mutual accountability. Once relational/organisational proximity is sustained and a shared repertoire is created, learning and knowledge sharing between members of the community can be increasingly facilitated through either face-to-face contacts or distant contacts via virtual proximity, drawing on communication technologies such as teleconferencing and e-mail.

As communities of practice are homogeneous groups that are composed of people engaged in the same practice and in regular communication with each other, it could be argued that this kind of knowledge community draws on the advantage of cultural and cognitive proximity. On the other hand, epistemic communities are heterogeneous groups composed of individuals who are characterised by different cognitions and cultural backgrounds. Thus, it is crucial to bring together the benefits of cognitive distance (diversity) and cultural proximity (identity). To do this, epistemic communities are required to establish a procedural authority, which is regarded as a coordination mechanism that reconciles cognitive diversity and cultural identity. This is a prerequisite for organisational proximity. The cognitive-cultural distinction makes it more difficult for members of an epistemic community to sustain organisational proximity than for members of a community of practice. This means that epistemic communities might require face-to-face interactions on a regular basis in order to reconcile cognitive differences and thereby connect new insights to radical innovations. Based on the example of Xerox, which established a strategic community – called the Xerox Transition Alliance – organised for the corporate-wide improvement of IT infrastructure, Storck and Hill (2000) argue:

Alliance members believed that almost two-thirds of the group's value was derived from face-to-face networking at the regular meetings. One Alliance member who had an especially expensive and arduous journey attended every other meeting and participated by audioconference when he could not attend in person. The importance of maintaining personal relationships in this way also distinguishes the Alliance from other high-performing teams, for which research indicates that physical proximity is not critical. Although face-to-face meetings are not prerequisite means of interaction for a community of practice, most communities do work this way (p. 68).

We need to read their statement carefully, because it is dangerous to view it as advocating the advantage of geographical proximity without considering relational/organisational proximity. The statement illustrates the process of creating relational/organisational proximity through the mobilisation of distant actors who are interested in a particular problem-solving task beyond delimited places and boundaries. The nature of learning, knowledge creation and problem-solving task is dependent on the degree and intensity of inter-personal and inter-organisational contacts. This is enabled by the distanced networks of communication and travel as well as the unbroken interplay between face-to-face and telemediated contact (Amin, 2001b). In other words, it emphasises the role of geographies of circulation and mobility – including, for example, conferences and meetings via both short and long haul journeys in learning through knowledge communities. In short, it could be argued that reciprocal and interactive learning and radical innovations in epistemic communities can be achieved by effectively combining these kinds of multiple proximities centred on the relations between actors.

#### ***3.4.2. Task-force teams, learning and proximity***

As with the other communities described above, the activities of task-force (or project) teams can also be promoted by drawing on a property of proximity. In this section, I argue that task-force teams seek to draw more on combining geographical proximity and organisational proximity than any other communities in the firm. Large

multidivisional firms attempt to make use of the advantage of proximity to organise and operate task-force teams which represent boundary-spanning co-working activities. These activities often require to mobilise distributed knowledge and resources over their global networks of operations. Such a strategy often takes the shape of establishing an exclusive site designed for only *ad hoc* task-force activities. Its aim is to not only enhance the efficiency of a task-force activity, but also to avoid the possibility of formal work organisations intervening in this activity. The task-force team is usually allowed freedom and autonomy in its activity.

A task-force team is composed of members who have different expertise and belong to different teams. These team members consist of specialists working different locations within the global networks of operations within the firm (Hargadon, 1998). While such a nature of teamwork may offer a chance to utilise the advantage of cognitive distance or variety, its relational/organisational proximity is questionable. To overcome this problem and steer task-force activities, some firms create a purpose-specific physical space. This is what is known as the co-location strategy. This kind of strategy tends to be frequently sought in order to effectively undertake projects or tasks, which require to mobilise a variety of expertise and knowledge. A new product development project is the best example to illustrate the accomplishment of a task through co-location. The co-location strategy deliberately seeks to reduce the period of the development cycle of the product through techniques of simultaneous engineering. But it also allows to decrease conflicts and mismatch and to mobilise distributed or separated competences of tacit knowledge in a coherent way. DiBella, Nevis and Gould (1996) illustrate a co-location strategy used by FIAT, an Italian car manufacturer, in the process of developing a new product:

New product development teams work together in 'co-location' in common, open work areas to facilitate communication and co-ordination. Staff from other FIAT Auto divisions, such as design, manufacturing and marketing, who are also assigned to the *piattaformas* – staff groups responsible for the new models of a certain size or cost – work in co-location. Where engineers and other functional staff once worked sequentially on related tasks, now they work concurrently in parallel rather than in

series. In this form of simultaneous engineering, new models are completed without the time delay that occurred when components were designed sequentially or when newly designed components had to pass from function to function (p. 365).

The FIAT case shows a co-location model where the project team members work together in part of existing work areas, while the BMW case illustrates a more radical co-location strategy which establishes a new R&D centre that brings together decentralised R&D laboratories in a certain space.

BMW has embarked upon a radical experiment in which some 6,000 engineers and support staff are co-located at its Research and Engineering Centre to the north of Munich... The Centre is much more than a conventional R&D facility, because it represents an unprecedented co-mingling of skills, including research, design, development, manufacturing, personnel, procurement, and patents. Such extreme co-location is designed to achieve one fundamental goal, namely to reduce the development cycle of new models by up to two years through the use of advanced simultaneous engineering techniques, in which manufacturing methods are developed in parallel with prototypes (Cooke and Morgan, 1998: 45-46).

On this site, members of a task force team may carry out all the tasks associated with the project. Until finalising the project, members of the team may always attend the laboratory prepared for the project. Members of the team usually work together at the same place. Relational organisational proximity may be facilitated through intensive processes of joint practices, open ways of communication and mutual efforts to understand each other. These are the processes of developing common language, mutual understanding and sense-making, and thereby can be a base that enables members to exchange and share their tacit knowledge in a more effective way. Effectiveness in communication is a property of relational/organisational proximity.

This is not the end of the aspects of learning by interaction and communication within the team. There are many other chances to share common interests and knowledge between members of various task force teams. Members of a task-force team often invite outsiders who have expertise and skills in a certain area of work and share, if

necessary, and discuss the problems that they face. In addition, task-force team members may learn outside knowledge via maintaining proximity at a distance such as business travels, the participations of conferences and telemediated contacts (see for example Hargadon, 1998). Throughout access to distanciated sources of knowledge, team members can learn tacit and codified knowledge that helps to solve a given problem. But knowledge acquired through these methods can also be shared within the team and, potentially, disseminated between teams carrying out diverse projects. Learning through these processes of interactions may play an important role in instilling new insights, ideas and knowledge in task-force teams. Novelty or radical innovation can be derived from bringing together multiple set of knowledge in and outside of a team boundary.

The nature of relationships between members depending on mutual commitment and trust would be actually crucial to making such interaction and communication effective. The role of communication and interaction lies in disseminating and sharing knowledge, largely tacit, through combining different forms of knowledge and thereby resolving potential mismatch and conflict. Hands-on communication and interaction may thus become effective only in case that people related become willing to collaborate, interact, and engaging with one another (Barker and Camarta, 1998). These may rely on the extent to which agents are proximate organisationally.

### ***3.5. Distanciated learning***

As explored above, corporate learning cannot be reduced to a matter of geographical proximity and localised learning. For large firms, learning need not be bound to a specific territorial boundary. Rather, corporate learning should place its emphasis on firm's capabilities to take advantage of knowledge decentralised inside and outside the firm. As Dicken *et al.* (1994: 30) argued, the dilemma facing firms, especially large firms, in today's turbulent competitive environment is that, to succeed on a global scale,

they must possess capabilities to be globally efficient, to be multinationally flexible, and to capture the benefits of worldwide learning all at the same time. This means that corporate learning takes place inside the firm through the network of intra-firm relationships as well as outside the firm through the complex network of inter-firm relationships (Dicken *et al.*, 1994). So to speak, firms learn within and across the boundaries of the firm. Perhaps, the globalisation of R&D activities and strategic alliances are most significant dimensions of corporate learning pursued within and across the boundaries of the firm. These learning methods have become increasingly critical to access external sources of knowledge. The rapid increase in the globalisation of economic activities and in global competition in markets and technology has forced firms to strengthen these strategies.

Following the globalisation of product markets, financial transactions and direct investment, large firms' R&D activities should be globalised, not only in their traditional role of supporting local production, but also in order to create interfaces with specialised skills and innovative opportunities at a world level (Tidd *et al.*, 1997: 138). The rationale that MNCs expand the geographical scope of R&D activities beyond their home countries varies. From the market perspective, foreign corporate R&D activities are pursued to adapt products and processes to local markets where adaptations to local tastes and traditions are important. Normally, market-specific R&D activities can be active in multinational firms in industries such as electrical appliances and automobiles.

However, the driving force of foreign R&D activities should be found in a broader way. The increasing tendency of foreign R&D activities is associated with firms' efforts to access and learn host countries or regions specific knowledge. Empirical studies prove this that, for multinationals, the locations of foreign R&D have tended to be concentrated in certain countries which are replete with the sources of knowledge critical to promoting firm's technological capabilities (Kumar, 2001; Pavitt and Patel, 1999). For Zanfei (2000), the local embeddedness of R&D activities is critical to enhancing the capability to learn local-specific knowledge and can be strengthened by

recruiting local personnel and building cooperative networks with local institutions such as firms and research institutes.

While the globalisation of R&D represents corporate learning based on intra-firm networks of relationships, inter-firm alliances are seen as critical sources of learning between firms. As mentioned in Chapter 2, alliance firms share information, such as market intelligence, and both tacit and explicit knowledge, such as skills, know-how and technologies, in a complementary way. Inter-firm learning processes involve a combination of tacit knowledge and codified knowledge as well as a combination of local knowledge and distanced knowledge. For example, technology sharing involves sharing of codified knowledge between firms, including patents, product technology and process technology (Inkpen, 1996). However, it needs more. To share technology requires interactive learning processes between firms through personnel exchange, face-to-face and telemediated meetings between alliance firms.

In addition, joint product development projects are also characterised by interactive learning processes. In doing this, alliance firms create joint project (task-force) teams. In a certain circumstance, alliance firms operate project teams on the basis of co-location. In general, members of the team, however, interact on a global basis (e.g. Bengtsson and Soderholm, 2002). They communicate through telemediated contact methods such as emails, fax and teleconferencing. However, in some circumstances, physical interactions such as face-to-face meetings and conferences between distanced project team members could also play an important role in creating and maintaining relational/organisational proximity. In short, these cases imply that learning does not necessarily need geographical proximity and need not necessarily be dependent upon localised learning. The increasing tendency of corporate restructuring such as the globalisation of R&D and strategic alliances illustrate that corporate learning takes place through networks of relationships across organisational spaces on a global basis.

### ***3.6. Conclusions***

In this chapter, I have reviewed the recent geographical literature on learning and suggested a relational/organisational perspective on learning and proximity by introducing the insights offered by knowledge or learning communities within the firm. I have argued that the current fashion stressing the power of the regions and geographical proximity as the sources of learning has been silent on how learning takes place and is organised in the firm and where the sources of learning come from. Learning reflects complex social relations in and outside of the firm. This is, namely, to represent that the process and outcome of learning is defined by a property of relational/organisational proximity. Nevertheless, these are often left in a black box in the geographical literature. It is claimed that it is time to delve into these questions and attempt to unpack the black box.

As a means of doing this, I have proposed that an understanding of the sources of learning and its process needs to be begun by scrutinising corporate contexts. Firms attempt to find sources of knowledge and learn them by mobilising and blending knowledge and competences distributed in and outside the boundary of the firm. This point represents that the sources of learning exist in organisational spaces. To exemplify this, I have tackled the relationships between learning and proximity, drawing on the concept of '*ba*' defined as a shared space, communities of practice, epistemic communities and task-force teams.

As stated in the previous chapter, knowledge or learning communities within the firm can be vital sources of learning and make a contribution to sustaining innovations by mobilising distributed knowledge and competences and blending varied forms of knowledge. It has been shown that their organising processes are deeply associated with the building process of relational/organisational proximity. Of course, this process could be more effective when they have geographical proximity, not least at the early stage of formation. Equally, it could be argued that geographical proximity



seems to be a necessary condition in order to increase the circulation of tacit knowledge, mainly between the same locality-based actors. It should be noted that geographical proximity is, conversely, likely to impede access to extra-local sources of knowledge and thereby decrease the possibility to produce novelties, which may result from cognitive diversity. This means that firms need to attempt to not only mobilise internal sources of knowledge which are distributed across complex organisational boundaries within the firm but also link with extra-firm sources of knowledge. As argued by scholars such as Allen (2000; 2001), Amin (2000; 2001b) and Oinas (1999; 2000), this is directly to show that a matter of which a firm constructs 'thick' relationships and relational/organisational proximity which span organisational and industry boundaries can be more crucial to acquiring knowledge and sustaining learning rather than that of which a firm maintains geographical closeness to others.

To understand communities in the firm that draw on relational sources of knowledge in its own learning processes can be of crucial importance. The density and strength of relational organisational proximity developed through practices of a certain community seem to influence its performance and learning process. In sum, the main point I have wished to make is that corporate learning is occurred and realised through the operations of the networks of relations, which refer to 'learning communities' organised in organisational spaces. Definitely, these may no longer be the assets of localised learning, because such learning is only possible by drawing on decentralised knowledge residing in corporate hierarchy and organisational spaces.

Finally, I claim that corporate learning does not necessarily need geographical proximity and need not necessarily be dependent upon localised learning. Large firms attempt to mobilise competences distributed within and beyond organisational spaces and learn tacit and codified knowledge through movements and relational networks. The increasing tendency of the globalisation of R&D and strategic alliances is clear evidence showing that corporate learning takes place through networks of relationships across organisational spaces on a global basis.

## **Chapter 4**

### **Research Methodology**

#### ***4.1. Introduction***

This chapter focuses on the methodology and the methods of analysis employed to carry out the case studies on the adaptation challenge facing Korean firms and to address the aims underlying empirical research. In section 4.2, I attempt to place the firm, the key unit of analysis of the thesis, on an evolutionary and institutional perspective in order to justify the methodological and analytical framework for my empirical research which will be tackled in the next section. In section 4.4, the rationale for the selection of the case study firms is suggested. Section 4.5 describes the process of approaching the case study firms and the methods of analysis used to carry out my empirical research. In the final section, difficulties and limitations raised in the course of fieldwork are described.

#### ***4.2. Studying the firm***

The central unit of analysis of this thesis is the firm. But, the firm, as one of the key economic institutions of the capitalist economy, has been a contested analytical category in economics and economic geography (Maskell, 2001; Taylor and Asheim, 2001; Yeung, 1999). The understanding of the firm has long been dominated by the neoclassical theories of the firm. Neoclassical approaches assume the firm as a rational, maximising utility with given and stable behavioural preferences within near perfect information (Foss, 1998; Hodgson, 1996, 1998). Regarding the firm as a processor of given information means that the firm may not need to learn. This implies that firms not only organise their behaviour towards an optimal reaction to

environmental signals but are also equally capable of optimising their behaviour. However, these neoclassical approaches make it difficult for us to understand questions such as the following: how firms behave differently and why they are different from each other in terms of learning and adaptation. Although there are great differences in the way in which firms exist, behave and evolve in the real world, these questions remain a 'black box' in neoclassical approaches (Nelson, 1991).

By contrast, the approach I take in this research lies in the evolutionary and competence-based approach to the firm, which emphasises firm-specific and context-specific dimensions of corporate adaptation and learning. The central assumption of this perspective is that the firm is not a static, but dynamic institution (Nelson, 1991; Nelson and Winter, 1982; Foss, 1993, 1998). This is to recognise that capitalist firms exist in diverse forms in terms of their existence and evolutionary processes in the real world, largely because all firms possess distinctive competences of its own (see for example Grabher and Stark, 1997). The firm-specific and tacit nature of competences is assumed to bring about the wide variations in corporate behaviour and performance (Nelson, 1991).

From the competence-based approach, the firm is seen as a learning entity (Foss, 1998). The firm is a collective organisation with a certain degree of competence-development capacity of their own. Firms are not seen as homogeneous units of rational utility maximization, as in neoclassical theory. Rather, they are differentiated units seen as capable of learning through the "double feedback loop" of assessing both their own experiences and that of their peers (Cooke and Morgan, 1998). As the firm is seen as a dynamic rather than a static entity, evolving elements including adaptation, learning and innovation, become central units of analysis. Along with this, the behaviour of the firm is seen to be path-dependent. This implies that past behaviours reflect the characteristics of current behaviours as claimed by Veblen (1899) over a century ago:

Institutions are products of the past processes, are adapted to past circumstances, and therefore never in full accord with the requirements of the present (p. 191).

The path-dependent nature of institutions has been one of the central questions in making sense of institutional change in institutionalism. Considering the relationships between learning and the nature of environmental change, the role of routines in learning presents the double sides of the coin. On the one hand, routines built up along a specific learning domain may provide the basis of competences for both competitive advantages in a stable environment. On the other hand, routines may result in lock-in that could constrain new learning in the face of radical change in the environment.

Lastly, as many argue (e.g. Dicken, 2000; Hollingsworth, 2000; Whitley 1992; 1999; Yeung, 1998; 2001), it is assumed that the operational characteristics of business organisations are influenced by the institutional systems or institutional arrangements in which they are embedded.<sup>9</sup> This implies that the paths and features of adaptation and learning by firms can be influenced by those institutional systems. As such, it can be assumed that firms produce the different processes and outcomes of learning and adaptation not only as a result of firm-specific contexts such as corporate culture and routines, but also as a result of macro-institutional contexts, including political economic conditions and national systems of institutions. In contrast to individualistic views as in neoclassical economics, the relationship between the firm and its surrounding institutional environment provides a basis for understanding the complexity and variety of adaptation and learning by firms. Adaptation and learning by firms cannot be simply reduced to the problem of efficiency of corporate strategy and organisational processes.

These assumptions have critical implications for the research methodology. Firstly, they demand that the focus is placed on examining contexts within the firm and the institutional contexts surrounding the firm. Secondly, they demand that the methodological and analytical framework should put history-specific and context-

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<sup>9</sup> An institutional perspective explains not only influences of national-specific contexts and institutional structures on corporate evolution but also, as argued by Yeung (1999), home country-specific features in the behaviours of transnational enterprises.

specific aspects in central position. Thirdly, they demand that the methodology must be sensitive to various kinds of learning undertaken to adapt to various kinds of challenges, including technologies in product and process, marketing, organisation, macro-market trends and political economic contexts in and out of the firm level.

These underpinnings have led me to employ qualitative methodologies for the empirical analysis. As opposed to the quantitative approach which seeks to generalise and simplify the complexities of organisational contexts by drawing on standardised measures, the qualitative methods of analysis centre on an understanding of knowledge '*situated*' in individuals and groups (Silverman, 2000; Dwyer and Limb, 2001).<sup>10</sup> Qualitative methodologies in corporate research can be a useful source of grounded, rich descriptions and explanations of organisational processes occurring through a certain corporate context (Schoenberger, 1991).

#### ***4.3. Methodological issues***

Following the above approach, my empirical work has two aims. The first is to understand how Korea's largest firms have responded to radical changes in their environment. It is assumed that the Asian financial crisis must have challenged their continuous survival, and I wish to see whether restructuring has been learning centred. Thus, I am seeing whether Chaebol act as latest theory would predict. The second aim is to examine the contextual variables, which are firm-specific as well as institutional environment-specific, that affect corporate learning and adaptation. I wish to illustrate (and criticise) the powers of the evolutionary and institutional approach to the firm. Most of the literature on chaebol has criticised chaebol's bad management practices and

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<sup>10</sup> Some scholars point out limitations of qualitative research such as a lack of reliability and rigor of its research (see for example Markusen, 2000; Martin, 2001). However, both methodologies have both strengths and weaknesses in analysing social phenomena and events. As Martin (2001: 197) argues, the common tendency for the two to be portrayed as incommensurate alternatives is highly misleading and thereby two approaches work best in combination, each informing, reflecting back on and complementing the other.

has suggested the need of radical reforms for survival.

In this thesis, emphasis is placed on understanding the contextual features of corporate responses to radical change and the complex processes of learning by Korea's large manufacturing firms. Therefore, I have chosen to consider the relevance of various kinds of learning strategies as theorised earlier and the contextual variables that influence the processes of learning. In doing this, I have selected to investigate as many the organisational units and individuals as possible. They include the management planning teams, the R&D teams and the production teams.

First, the management planning team has been considered the primary sources of information with regard to corporate restructuring and organisational changes. This unit is dedicated to designing and evaluating the corporate strategy. Managers in the management planning team possess knowledge of the issue in which I am interested. But they also have authority and power to allow me to access managers in other organisational units. Often, access to senior staff in the management planning team is likely, prior to others when conducting corporate fieldwork. From this organisational unit, I expected to get general information about the case study firm, including corporate history, human resource management, organisational competences and culture, organisational structure, corporate strategy and the restructuring process.

Second, the R&D unit can be regarded as the key sources of technological learning and innovations in large manufacturing companies. In particular, for multinational manufacturing companies competing for global markets, R&D capability is a crucial factor that affects survival. Continuous product innovation is the key to leading technological competition and sustaining continuous adaptation. Investigating R&D units may offer an opportunity to explore technological learning and innovation activities, technological competences and the mobilisation of technological knowledge which are critical to identify various dimensions of corporate learning, involving both soft and hard learning, and the possible paths of corporate evolution.

Third, the production unit is an important source of learning and organisational change. The manufacturing activity cannot be simply reduced to the production of products through input of production factors such as capital and labour. Rapid changes in customer demands and the increase of inter-firm competition have forced firms to innovate not only in products but also in manufacturing process. They have to produce multiple products on the basis of the principle of mass production in order to meet fragmented customer demands. Along with this, they have to attempt to sustain process innovation cut production costs down in order to improve productivity. The approach to the production team provides a lot of implications for understanding corporate learning and adaptation. In addition to this, Korean firms have faced an additional challenge to restructure since the crisis. Major programmes of corporate restructuring urged by the government have been focused on downsizing accompanied with mass job losses. As these restructuring processes mean a direct impact upon production activities, the investigation has also included the process of downsizing and employment adjustment and its implications for learning and adaptation.

Finally, empirical work has been focused on the role of communities in the firm in learning. Communities of practice are defined as homogeneous groups of employees engaged in the same practice in regular communication with others through mutual commitment. Epistemic communities are heterogeneous groups in which recruitment occurs through peers, to work explicitly on a common knowledge problem. They have a clear intention, often strategic. Meanwhile, task-force teams are more strategic and organised to solve a certain problem facing the firm. The features of communities of practice can be revealed by examining organisational routines and daily work processes, especially in both R&D and manufacturing units. Meanwhile, epistemic communities and task-force teams are strategic communities. Most of all, these communities appear to be significant in R&D activities. Therefore, an investigation of communities has been made mainly in the R&D units.

#### *4.4. The Selection of the case study firms*

To undertake the empirical work, most crucial was the selection of case study companies. There is no doubt that, ideally, the more the number of case study companies, the more the result of the study is likely to become reliable and valid. However, it is extremely difficult for academic researchers to access large firms in general and Korean chaebol companies in particular. They tend to be reluctant to give researchers corporate information.

In fact, most empirical studies of chaebol companies have been done by either renowned academic scholars who already have contacts with top managers or researchers who have once worked in the companies. I enjoyed neither privilege. This made it difficult for me to access a range of companies. Therefore, I chose to study two electronics companies: LG Electronics Co. (henceforth LGE) and Samsung Electronics Co. (henceforth SEC).

The Korean electronics industry has been dominated by four chaebol companies: Samsung, LG, Hyundai and Daewoo. In addition to the two case study companies, Hyundai Electronics Company specialises in semiconductors and Daewoo Electronics Company specialises in consumer electronics. When I was considering the selection of the case study firms in early 1999, industry expert outlook on these two companies was not bright. Hyundai still continues on a massive restructuring path and is striving to sell off major business divisions. Daewoo too has been struggling to survive since the outbreak of the Asian financial crisis. In early 1999, it nearly closed down its plants. I realised that I would not have access to these companies for fieldwork. In addition, I thought it was too risky in terms of the promise of results.

However, the main reasons for choosing LG and Samsung are two-fold. First, both are flagship companies in Korea as well as in each conglomerate. Although both



companies operate in rather differentiated business portfolio, they have also been competing for both domestic and global markets in a wide range of product and technology within the electronics industry. They share, to a degree, similarities in terms of business structure, governance structure and corporate culture. These similarities are influenced by the fact that they have evolved under the same institutional environment, often identified as a national specific context (see for more details Biggart, 1997; Hamilton and Feenstra, 1997; Whitley 1992; 1998; 1999). But, it is also clear that each of these also represents distinctive features of its own in terms of organisational capabilities, management practices and corporate culture. I assumed that these features would help to make clear similarities and differences in learning and adaptation.

Second, the electronic industry in which both companies are specialised typifies dynamic changes propelling radical learning. This industry is characterised by varying degrees of knowledge intensity ranging from standardised knowledge to highly knowledge-intensive sectors, the rapid technological changes driven by technological advancements and convergence, highly volatile market competition resulted from globalisation and market saturation. Ernst (2000b) describes the present situation of inter-firm competition in the electronics industry:

Market positions are highly volatile, new entry is possible, and not even market leaders can count on a guaranteed survival (p. 1).

This implies that electronics firms faced by a pressure to rapidly respond and adapt to the pace of radical change should illustrate the dynamics of corporate restructuring and learning practices in many ways. Therefore, these choices may make them good examples to compare learning and restructuring practices between firms.

## ***4.5. Methods of analysis***

### ***4.5.1. Approaching the case study firms***

The fieldwork was carried out from June 1999 to October 1999. As mentioned above, I had no direct contacts with employees in either company before undertaking the fieldwork. As the first stage in contacting the companies, I sent the public relations team at each company's headquarters a letter requesting their cooperation for the fieldwork and the details of the fieldwork methods and schedule. The fieldwork methods designed included participant observations in one of each firm's R&D laboratories and factories for at least two weeks as well as interviews with employees ranging from top managers to factory workers. That is because I deemed that participant observation would help identify the micro-sources of learning and innovation and understand the role of communities in corporate learning by investigating learning practices occurring through day-to-day practices.

Unfortunately, however, the response was disappointing. Instead of introducing relevant personnel to me, I was asked to contact senior managers in charge of teams and plants which I wanted to contact. In addition, they did not accept my request to meet top managers. This kind of response was what I more or less anticipated, reflecting my previous experiences on corporate interviews (Lee, J. H., 1998). Then, I tried to call some managers working in the R&D laboratories and plants of each company and requested them to allow me to do the fieldwork. Their responses also were not positive. Most responded by saying that not only were they too busy to allow me to carry out the fieldwork in their companies but also that my fieldwork methods were unacceptably comprehensive. Only few gave permission to interview with their staff, at best with one or two employees working in a certain sub-organisation unit.

At this depressing point, thanks to a relative's effort, I was able to meet a senior engineer working at the central R&D laboratory in one of the companies. I

interviewed him and asked him to introduce me to the chief manager at a product-specific laboratory I wanted to approach. The laboratory allowed me entry and I was at the final stage of coordination with the staff members on my fieldwork schedule. But, after a week, they phoned me to give notice that they were no longer able to accept my request, because the senior engineer who guided me to the laboratory had moved to another company – a high-tech new start-up company – just few days ago!

In the course of these attempts to approach the companies, I was forced to contemplate the impossibility of fieldwork in big companies using qualitative research methods. But, I did not give up. I found out some important ‘tricks’ needed to contact the firms with the purpose of fieldwork. First, I should not reveal that the fieldwork would be conducted in both LGE and SEC. Instead, I had to say I am planning to study ‘only your company’. Both companies were competing with each other for the recruitment of talented engineers and both companies were very concerned about the leakage of confidential corporate information. This was happening in early 2000 and, consequently, badly affected my fieldwork. The second trick was that I should directly contact chief managers in charge of the factory or laboratory operation and to get permission to do the fieldwork from them. Without obtaining their consent, it appeared clear that my fieldwork would fall very short of my expectations.

Prior to the third round of attempt at the fieldwork, I realised that I had to alter my methodology, abandoning ethnographic methods such as participant observation and instead to focus more on interviews with managers working in a wide range of fields. I met my postgraduate advisor and a professor of economics, both at Kyungpook National University and explained my situation. They started to find persons with personal networks with senior managers in both companies. Thanks to their help, I was able to meet an engineering professor acting as the chief technology advisor of LGE. He not only had a great deal of knowledge of LGE but also knew senior staff members in both case study companies. He rightly called LG senior staff and at last I was able to start the interviews. But, they still did not allow ethnographic work but

kindly guided me to interview with managers with the best knowledge in their own work area. However, in the course of interviewing, I did have opportunities to talk informally with workers during the lunch break time as well as to observe the work processes in the R&D laboratory and the manufacturing lines. The professor also played a bridging role with some managers in SEC. Interviews with SEC managers were conducted individually out of work times at places such as a restaurant. However, I also participated in a workshop on technological innovation held in SEC headquarters hosted by the corporate innovation study group composed of SME managers and academic researchers. As a result of this workshop, I had the opportunity to talk to some senior managers in Suwon headquarters and workers in the factory.

#### ***4.5.2. Interviewing***

The main methods that I have used were semi-structured in-depth interviews. To avoid misinterpreting the data collected from the interviews, I conducted corporate interviewing through triangulation processes. Prior to conducting the interviews, I reviewed a number of secondary data, ranging from corporate history and restructuring processes to the Korean economy and management theories. I deemed that this process enables to make sense of the precise meaning and context of narratives produced through the reflections and memories of interviewees. As Schoenberger (1991) notes:

The respondent will be reassured to know that the investigator understands the issues under discussion and is likely to both more open and more detailed, and more likely to allow the researcher to control the general direction of the interview (p. 186).

In fact, in the course of interviewing, respondents in managerial positions often tended to use the specialised terms. For example, some of the respondents working in the areas of management planning and R&D management frequently used specialised terms and concepts – for example EV (economic value), spec. (product specification) – in their narratives. Were I to ask them about the meaning of the term, this could waste

time or miss the main point of the question.

Most interviews were semi-structured and conducted under a set of themes as illustrated in Table 4.1. There are some main areas of investigation common to all groups. Questions concerning organisational changes since the crisis have aimed to identify what firms have done to adapt to the crisis. In line with this, by questioning key challenges facing the firm and the sub-organisations, I wanted to grasp what firms have been faced and what they have to do to sustain adaptation. The second set of issues concerned organisational contexts such as culture, routines and competences that could affect the paths and outcomes of learning and adaptation. I deemed that these aspects are important to make better sense of the following questions concerning the characteristics of learning strategies firms take.

The third set of common questions focused on the types and characteristics of corporate learning. These questions highlighted what kind of learning for what kind of adaptation, the sources and processes of learning and the positive and negative factors affecting the processes and outcomes of learning. Together, the questions concerning learning concerned ways of social learning through communities such as communities of practice, epistemic communities and task-force teams. Finally, these themes of questions paid particular attention to the geographical implications for learning and adaptation. In other words, the questions concerned how firms use space and place in order to learn and adapt, how different forms of proximity contribute to learning. These questions helped to understand the relationships between corporate learning and geography.

Table 4.1 Main themes of investigation during the interviews

Management	R&D unit
<b>Major changes since the crisis</b> Both at the firm level and the sub-organisation level	<b>Major changes in R&amp;D since the crisis</b> Organisational changes Technological changes Geographies of R&D organisational change
<b>Key challenges to continuous survival</b> Both at the firm level and the business division level	<b>Key challenges to technological competition</b> Both at the firm level and the business division level The nature of current technological competition The direction of technology strategy
<b>Corporate strategy</b> The nature of competition in the given industry The focus of firm strategy Recent changes in firm strategy	<b>Technological competences</b> Firm-specific competences: strengths and weaknesses Positive and negative aspects in new learning
<b>Organisational culture and competences</b> Firm-specific culture and competences Strengths and weaknesses Positive and negative attributes in new learning	<b>Routines in R&amp;D activities</b> Daily work practices The way of problem-solving and learning The relation and coordination between R&D units and between R&D and other functions related
<b>Types and characteristics of learning seeking at present</b> Types of learning Source and processes of learning Methods for resolving the path-dependency Evaluation and possible outcome of the learning	<b>Technological learning and innovation</b> Types of technological learning Sources and processes of learning Factors facilitating/or hindering learning
<b>Recruitment and training of employees</b> Methods of recruitment and the programmes of workers training The role of recruitment and training in the acquisition of knowledge and the learning	<b>The role of communities in learning</b> Communities of practice activities The operation of task-force team Epistemic communities
	<b>Geographical implications for learning</b> The nature of proximity in learning The role of the local in corporate learning The uses of space place in corporate learning

*Continued*

<b>Production unit</b>	<b>Industry specialists</b>
<b>Major changes in productive organisation since the crisis</b> Employment change Employment adjustment process and its effect on learning and adaptation Changes in production process Process innovation Geographies of such changes	<b>Challenges faced by chaebol in general and Korea's largest electronics companies and in particular</b> Management practices Governance structure Organisational and technological competences Quality of labour market
<b>Key challenges faced by productive organisation</b> Both at the firm level and the business division level The central issues in manufacturing The direction of production strategy	<b>Characteristics of corporate culture and competences</b> Corporate culture of Korean firms in general and of both firms in particular Firm-specific competences: strengths and weaknesses Positive and negative aspects in sustaining learning and adaptation
<b>Competences of productive organisation</b> Firm-specific competences: strengths and weaknesses Positive and negative aspects in sustaining learning and adaptation	
<b>Routines in production activities</b> Daily work practices The way of problem-solving and learning The relation and coordination between production unit and other functions related, especially R&D	
<b>Learning and innovation in production activities</b> Focus and types of learning Sources and processes of learning Factors facilitating or hindering learning	
<b>The role of communities in learning</b> Communities of practice activities The operation of task-force team Epistemic communities	
<b>Geographical implications for learning</b> The nature of proximity in learning The role of the local in corporate learning The uses of space/place in corporate learning	

As mentioned in section 4.3, the specialised areas of interviewees vary, ranging from management and the R&D units to the production and the production technology units (see Table 4.2). Most of the interviewees were in a managerial position – well informed, experienced veterans working in each company for more than 10 years. Together, most of the interviewees were those who work in the business division which operates in a specialised domain of business. Although I did not choose intentionally a specific location and business unit for empirical work, the location and the business unit carried out the interviews tend to be concentrated in a certain place and business unit.

Table 4.2 Interviews by groups of interviewees

Corporate managers				Industry experts	
Units	LGE	SEC	Total	Groups	Total
R&D	10 (3)*	5 (1)	15 (4)	Local institutions	2
Management planning	4 (1)	2 (1)	6 (2)	Management experts	2
Production	4 (0)	2 (0)	6 (0)	Technology experts	2
Total	18 (4)	9 (2)	27 (6)	Total	6

\* Of which the number of interviewees whom the author carried out repetitive interviews based on open discussion.

In LGE, I carried out interviews with employees working mainly in the Digital Display Business Division based in Kumi. In spite of still being to a degree influenced and controlled by the headquarters, each business division has an independent organisational structure and management system. The remaining interviewees include managers at the Digital Appliance Division based in Changwon and engineers at the central R&D laboratories based in Seoul. In SEC, the interviews were undertaken mainly in Suwon and partially in Kumi. The reason for this is that most of SEC's organisational units are geographically clustered around Suwon. In Kumi, there is only a telecommunication equipment manufacturing plant without an R&D function (for details on organisational map of both companies, see Figure 5.3 for LGE and Figure 6.4 for SEC). In the course of a fieldwork, I tried to contact managers at the management planning team earlier than managers at other departments. The reason for this is that I assumed that they possess overall knowledge related to their company. In turn, I met



staff members of the R&D team and lastly employees of manufacturing lines.

Finally, I tried to carry out repeat interviews with managers who not only possessed profound knowledge on their company but were also amicable towards me. I met them in family restaurants. The meeting place was of paramount importance not only to discuss various kinds of corporate issues in a relaxed environment and crosscheck the previous questions but also obtain some corporate documents. Such open discussion meetings lasted from two to almost five hours.

In addition to interviews with corporate managers, I carried out interviews with some industry experts specialised in the electronics industry and electronics technology such as university professors and consultants at a local chamber of commerce. The interviews with them helped me to understand technological changes in the electronics industry, trends of the electronics industry and corporate culture.

#### *4.5.3. Secondary sources*

In undertaking empirical research, secondary data have been extensively used. Secondary data have been collected through two sources. The first includes corporate documents such as annual reports, company brochures, project plans and project performance reports. Most of these documents were generously provided by some interviewees working in LGE. However, SEC interviewees were very reluctant to give me internal documents, even though access to the interviewees was done on a personal basis. They said that the circulation of corporate documents is strictly monitored. I managed to get some documents during the participation of a workshop held in SEC headquarters. They provided important historical and background information and materials on corporate strategy and corporate vision.

The second source was a number of news articles on both companies. *The Korean Electronics Times (Jeon-Ja Shin-Moon)* was used as the most useful source as it

provides readers with daily information on events, phenomena and changes taking place in electronics companies, especially in LGE and SEC as they are industry leaders. The other archival sources include economic newspapers (the same form as the Financial Times in the UK) and economic magazines published both in Korea and overseas. These sources were used to study the leadership and the rationality of top managers and corporate strategy. Secondary data were crosschecked with interview results transcribed in a field note.

#### ***4.6. Difficulties and limitations***

I encountered many difficulties during the empirical work. Especially, the empirical research could not tackle in detail some of what I wanted to look for such as the role of communities in learning and adaptation. I could not conduct more extensive interviews and in-depth methodologies such as focus groups and participant observation. For example, in the course of interviewing, I recognised that the improvement of subcontracting relationships and the intensifying technological learning processes for product innovation can be important for corporate adaptation. However, I could not go further because of the fundamental limits to accessing people and the organisations involved. In addition, the inability to conduct participant observation severely restricted my research on the dynamic role of communities in learning and adaptation, especially in SEC. Then, the relative modesty of evidence on SEC made it difficult to carry out a comparative analysis between both case study companies.

In conclusion, when I went back to Korea in order to conduct the fieldwork, I called my friends, relatives and professors who once taught me and told them I was going to study LGE and SEC with qualitative methodologies and I asked them if they knew any one working in both companies. Their responses were varied but largely pessimistic: “Are you crazy?” “Before too late, change your mind. I can introduce you to local small company workers!” Even industry experts asked me to change the cases. They said:

“what about studying new start-ups? Korea is in a fever of venture companies”.  
“Big firms are still too closed and cocky.” But an economic geographer encouraged me try: “Do it! Because chaebol, big firms, are of paramount importance to understand the Korean economy and economic spaces. It will be difficult but you should do it!” These responses reveal the methodological limitations I faced.

## Chapter 5

### Learning and adaptation in the LG Electronics

#### *5.1 Introduction*

This chapter presents a case study of the LG Electronics Company, the flagship company of the LG group. In recent years, particularly since the economic crisis, the company has made various efforts to restructure in order to sustain long-term success. This chapter starts by examining traditional restructuring attempts, based on downsizing, the rationalisation of employment, the reorganisation of production, and the reform of organisational structure. I will show that these ways of restructuring have been critical not only to respond to the economic crisis and a political pressure from the government, but also for long-term success. It will be revealed that restructuring centred on downsizing, employment adjustment and the change of organisational structure has offered the company the basis for unlearning obsolete practices and routines and sustaining new learning.

I will also show that spatial reorganisation of production and R&D units has been closely associated with spatialities of learning. Spatial shifts of production units have been dependent upon a cost factor as well as the degree of knowledge and competences overseas plants possess and the interactive learning between the domestic parent plant and the overseas local plants. But spatial reorganisation of domestic R&D units has also shown critical implications for understanding the corporate use of space/place and the influence of both geographical and relational/organisational proximity on intra-firm learning.

In what follows, I explore various dimensions of learning and innovation that the

company has pursued to improve its competitiveness. In section 3, I will show that the company has shown diverse learning practices to sustain innovations in production processes. In sections 6 to 8, I pay attention to LGE's technological learning across both national and extra-national boundaries. In section 6, I illustrate the processes of organisational and technological learning taking place between R&D units, and between R&D and manufacturing. In sections 7 and 8, I discuss the recent tendency of the globalisation of R&D activities and inter-firm alliances, considered as a critical means to adapt to increasing competition in technology and markets as well as a means of distanced learning beyond boundaries of limited space/place. The final section deals with intra-firm social learning occurring through both formal organisations and informal groups with reference to communities in the firm.

## ***5.2. Downsizing and reorganising the internal labour market***

LGE took the decisive step of restructuring by selling or otherwise disposing of operations and the like which seemed to have little future... This has allowed us to devote our resources to our core business areas (CEO of LGE, New Year's message, 1999).

One of the pressing questions that the Korean chaebol have faced in the wake of the Asian crisis is how to reduce excessive debt to equity ratio, eliminate cross-debt guarantees among affiliates, and improve corporate governance structure. It has been argued that unfavourable management practices result from excessive competition among chaebol and an obsession with corporate growth rather than profitability (Chang and Park, 2000; *The Economist*, 14 Nov. 1998). Of these problems, reducing excessive debts has become one of the most critical questions to chaebol firms struggling to survive, as the Korean government has strongly urged them to lower their debt to equity ratio to less than 200 per cent by the end of 1999.

The LG group is no exception. LGE, the flagship company of the group, also attempted restructuring strategies to resolve the problem. Downsizing was the first choice of the company to cope with radical changes. Downsizing became central to the chaebol's corporate restructuring, because the IMF and the Korean government requested that they follow a guide to restructuring and keep global management standards, which American firms have established, in both implicit and explicit ways. Downsizing at the expense of labour has not just been conceived as the most conspicuous way in which American firms have taken to restructuring (Usui and Colignon, 1996), but is also, in many ways, treated as equal to corporate restructuring (Froud *et al.*, 2000).

As soon as the government announced the restructuring plan for the chaebol, LGE set out a series of plans to restructure its business portfolio. In undertaking business downsizing, LGE had two basic rules. The first was to abandon marginal businesses that had lost profitability or likely to lose growth potential in the future. The second was to outsource or spin off non-core operations and businesses. The majority of downsizing processes took place between 1998 and 1999, although the downsizing programme is still active.

LGE withdrew completely from the printer business in 1998 and the hand-held personal computer business in 1999. Both were evaluated as businesses that showed low returns and expected to be of high-risk in the future. In addition, some businesses, including low profit telecommunication sectors, commercial motors and motor pumps, were sold off in 1998. However, means such as withdrawal and sell-off are one aspect. The most active way in which Korean firms have taken to downsizing after the crisis is the spin-off strategy, to outsource non-core or less competitive activities. It seems clear that the company also sought to remove the surplus workforce through restructuring the business structure.<sup>11</sup>

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<sup>11</sup> Historically, the company had a bad experience in labour-management relations during the late 1980s. In 1987, a great wave of social democratisation had been started by the social movement towards political democratisation (see Park, B. 1999 for more details on this issue). Although LGE workers, like those of

The company, for instance, has separated non-core business sectors such as general affairs (1998), casting (1998), distribution (1998) and after-sales service (1999) (see Table 5.1). Some of this produced completely independent firms in the form of EBO (Employees Buy-Out), while the rest produced spin-offs in the form of a subsidiary under LGE ownership. The separated companies still act as service providers or suppliers for LGE. In the course of this form of business restructuring, the number of employees was decreased. Although there are no official statistics to show the number of workers decreased by this process, it is known that more than four thousands employees of the company were made redundant (*Korea Daily Business*, 10 December 1998).

Table 5.1 Major cases of business downsizing (1998-2000)

Forms of downsizing	Sectors
<i>Withdrawal</i>	Printer (1998) Hand-held PC (1999)
<i>Sell-off</i>	Low profitable telecom sectors (1998), Commercial motor/motor pump (1998)
<i>Spin-off (EBO)</i>	General affairs (1998) Casting (1998)
<i>Spin-off (Subsidiary)</i>	Distribution (1998) After-sales service (1999)

Sources: based on *Korea Electronics Times*; *Korea Daily Business*  
(1 January 1998 ~ 30 April 2001).

Prior to discussing the process of employment adjustment, the reform to the labour law in the wake of the crisis needs to be noted. The financial crisis has, to a large extent,

other Korean firms, claimed to institutionalise workplace democratisation within the firm, involving the legitimisation of union activities, workers' participation in decision-making process, top managers did not listen carefully to their voices. Consequently, two labour disputes had been occurred in 1987 and 1989 respectively. These not only caused a great loss in the company but also resulted in many negative effects on managerial performance for a long period of time. However, such experiences gave top managers a valuable opportunity to rethink the importance of labour-management relations and to change their perspective on labour. Since that point in time, the company's top managers have made great efforts to restore and rebuild labour-management relations. The company has consequently been recognised as a successful model that maintains proactive labour-management relation. Therefore, in the face of employment adjustment, management leaders wanted to solve redundancies while minimising the potential of negative effects and conflicts with the union.



influenced the shifts in the labour market in Korea. The IMF pressed the Korean government to improve labour market flexibility, in exchange for financial support to the Korean government. Korea's labour law makes rapid restructuring of firms difficult in that it is illegal in Korea to lay off workers except under unusual circumstances, such as bankruptcy.<sup>12</sup> The IMF also ruled that the rigidity of the labour market might hinder radical corporate reform needed for Korea's economic rehabilitation. The IMF argued that a rigid labour market restricts the ability of firms to adapt flexibly to a turbulent socio-economic environment and, as a result, gives rise to disastrous outcomes, such as corporate bankruptcy and mass unemployment. The IMF wanted the Korean government to transform its labour law into American-style labour conventions for a flexible labour market.<sup>13</sup>

In response, a committee composed of government representatives, corporate leaders and trade union leaders was convened. It agreed to revise the labour law on the basis of the following agreement (The Korean Ministry of Labour, 6 February 1998)<sup>14</sup>:

Provided that there is inevitably the need for lay-offs in the process of corporate restructuring, despite attempts to avoid lay-offs (such as the reduction of working hours, ceasing from new recruitment and re-contracts with temporary workers), the employer is allowed to carry out lay-offs by the procedures and requirements stated clearly in the law.

With the help of the new labour law, firms began to accelerate employment adjustment. LGE attempted to induce an early retirement and a spontaneous retirement before undertaking massive job cuts. This was effective, because a large number of employees retired, with the offer of an additional monetary incentive. A manager of the manufacturing team explains in interview the situation at that time:

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<sup>12</sup> See *The Economist* (24 January 1998).

<sup>13</sup> The prime concerns that The IMF urged the Korean government to reform labour market flexibility were: 1) to amend legislation to clarify the circumstances and procedures for layoffs, in the context of the Tripartite Accord (involving the government-capital-labour); 2) to relax restrictive legal provisions relating to private job placement and manpower leasing services (*Korea Economic Weekly*, 2 March 1998).

<sup>14</sup> That agreement is called as "the great compromise between labour, management and the government".

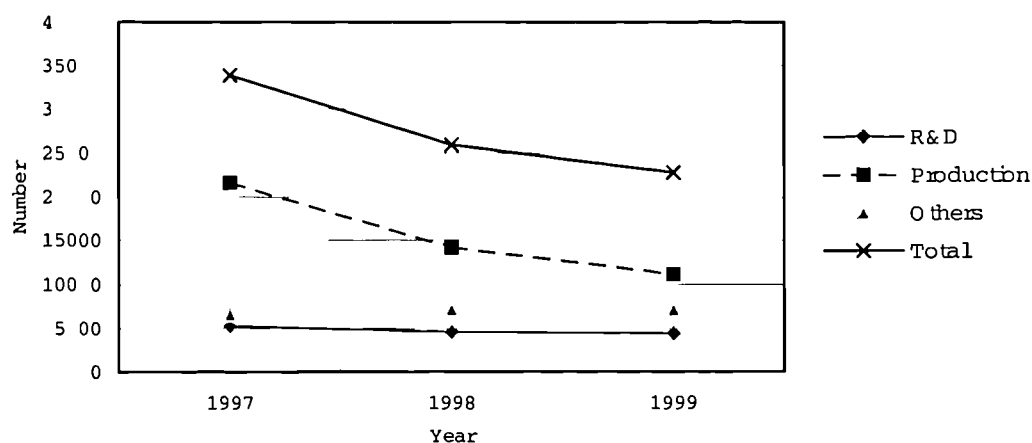


It was a painful and disgusting process. The date when the list of lay-offs would be came close, most comrades felt terrible. I thought even I could be a target. Whenever I went out of my house in the morning, I used to consider seriously whether I should submit a letter of resignation today, then I could leave my workplace with more money. Otherwise, if I am selected to be made redundant, I have to go away without any incentive (L-6, 31/08/00).

This means that the programme, from the viewpoint of the company, contributed to inducing spontaneous retirement, while minimising conflict with the labour union. This kind of employment adjustment policy is not unusual in Korean firms.

As Figure 5.1 shows, the number of domestic employees decreased from 33,800 to 25,900 between 1997 and 1998, almost a quarter of the workforce. During the same period, R&D and engineering workers decreased by 13% (5,289 to 4,583), while production workers decreased by 35% compared to the previous year (21,654 to 14,149). Although the decrease continued in 1999, the rate became significantly slower and most of it was centred on production workers.

Figure 5.1 Changes in the number of domestic workforce



Sources: LG Electronics Company Annual Reports.

\* As of December 31 of each year.

• The others are composed of marketing and business support jobs.

In fact, many production workers were laid off, due to production shifts of low value-

added products to overseas branch plants (mostly in Southeast Asia and China). For example, since the crisis, the Kumi TV plant, which assembles a variety of TV models, has cut more than half of its production workers by restructuring production lines. According to managers interviewed, employment adjustment undertaken by the company focused largely on production workers who received high wages, but had low skills.<sup>15</sup> As argued by a manager of the management team:

When it comes to the process of employment adjustment, the company tried to lay off workers who are considered less open-minded, less active and creative, or incompetent. I recognise that it does not mean all the people laid off by the employment adjustment are like this. Some comrades may be likely to be laid off for political reasons. Nevertheless, we would say that such an employment adjustment has made a contribution to unlearning old routines, and seeking new ways of doing things (L-1, 23 07 00).

This may, meanwhile, be viewed as a kind of ‘crisis building process’ (Kim, 1998), because remaining workers had a strong sense of crisis and recognised that there was no way to survive without change. In general, such a sense of crisis has played a positive role in shifting organisational culture, normally seen as resistant and insensitive to change, towards a flexible one.<sup>16</sup>

Together with employment adjustment, followed by the increased flexibility of the national labour market, LGE has attempted to increase temporary labour contracts with a view to saving labour costs. It is true that this strategy has been possible thanks to large-scale lay-offs; many of them production workers. This has been adopted at the company-wide level, but out of three business divisions, it is most notable in the Digital Appliance Division (DAD) producing home appliances, such as refrigerators and air conditioners.<sup>17</sup> The reasons that DAD decided to actively use this strategy are two-

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<sup>15</sup> Interviews with a team leader of Super A team, DDD (L-4, 22/07/00), a manager of the development support team, DDD (L-10, 19 08 00) and a manager of the DND Super A team, DDD (L-15, 26/07/00).

<sup>16</sup> Interviews with a manager of the management team, DAD (L-2, 14/07/00), a team leader of Super A team, DDD (L-4, 22/07 00), a manager of the manufacturing team (L-6, 31/08/00) and a manager of the DND Super A team, DDD (L-15, 26/07/00).

<sup>17</sup> Interviews with managers of the management team, DAD (L-2, 14/07/00; L-3, 20/07/00).

fold. On the one hand, consumer electronics goods that the business division produces are characterised by saturated markets and largely codified product & production technologies. Therefore, cost-saving is more critical than in any other business divisions producing high technology electronics goods. On the other hand, products such as refrigerators and air conditioners show a strong seasonal fluctuation in consumer demands, thus, the need to flexibly use labour. For instance, in the air conditioner production line, more than 60% of the workers are temporary workers who belong to labour service companies and many of them are married women.

### ***5.3. Process innovation***

There are two basic principles on which modern capitalist industrial firms organise production: firms strive to optimise organisation in order to maximise productivity, on the one hand, and to minimise costs on the other. In this regard, the organisation of production is critical in determining the efficiency of production. The principle of mass production has long been central in the large global manufacturing firms since the Fordist production system emerged in the early 20th century. Although there have been sharp debates among social scientists on transition in the modes of capitalist production during the last two decades, it is believed that mass production remains dominant in the certain large manufacturing firms which seek both economies of scale and economies of scope (Hudson, 1997). However, it is also true that mass production itself assuming mass demand is no longer effective in unpredictable market situations. Global market conditions have recently been more turbulent and complex, and thus technological changes have been more dynamically accelerated. These sorts of changes have appeared in the globalising process of corporate activities for many decades. Aspects of these changes have become critical in globalised electronics firms. Thus, these conditions have required them to adapt rapidly.

LGE, like other large electronics firms, shows significant changes in organising the

production process. First of all, the increasing fragmentation of customer demand and taste has led to a significant increase in the number of product models, even in the same product area (e.g. TVs). Concerning the product life cycle model (Abernathy and Utterback, 1978), many existing consumer electronics goods are characterised as having increased market saturation and technological standardisation. It is thus not surprising that emphases are placed on improving product design, strengthening marketing and capturing niche markets. To do this, the need for introducing new manufacturing techniques has been observed, as the classic mass production method is no longer appropriate to sustain efficiency for multi-products, as well as to respond quickly to increasing fragmentation of customer demands and tastes. In a similar vein, the emergence of display device products, such as PDP TVs (Plasma Display Panel TVs), TFT-LCD TVs (Thin-film Transistor Liquid Crystal Display TVs), Projection TVs and large-size flat screen TVs, which do not yet have a large volume of production, has challenged the continual adaptation of traditional ways of mass production. As a senior manager of the manufacturing team in the Kumi TV plant notes:

Those display devices are competing with one another for the next generation in the digital display market. They all, however, have both strengths and weaknesses as new display commodities. Market demands of these display products are also not matured at present. Nothing shows reliable advantage at the moment. In light of profitability, it is fair to say that those must not be produced yet. Nevertheless, we are investing in all of them in order to solidify a pre-occupation of an emerging display devices market. The result would depend entirely on the choice of customers and technological progress. In this regard, we have tried to construct new production system, such as cell production and modular production (L-8, 29/08/00).

One new production method that the company has recently tried to adopt is modular production. Introducing this production method is critical, as far as manufacturing competitiveness is concerned.<sup>18</sup>

It is generally recognised that this production method contributes to improving

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<sup>18</sup> In fact, all of the largest Korean electronics manufacturers (LG, Samsung and Daewoo) have already noticed that Japanese electronics makers have gained their competitiveness through long-term efforts to standardise parts/components. Interestingly, these companies are planning to make a collaborative consortium for the standardisation of some parts/components.

productivity and product quality, as this method makes assembly procedures simple by reducing the number of parts/components needed for production. Thus, this method leads to reducing the error rate in the manufacturing process as well as assembly time.

It is not easy for firms to sustain this kind of process innovation, because firms need to complete the standardisation of related parts/components prior to introducing this method. The parts/components standardisation project was not easy to implement because it required comprehensive collaboration and coordination between cross-boundary teams and subcontracting firms supplying parts/components. Of the big three Korean electronics manufacturers (Samsung, LG, Daewoo), LGE has most actively pursued standardisation of parts/components since 1998. LGE has most perceived the need to improve manufacturing productivity as a means of sustaining competitiveness. More importantly, LGE managers have thought that they possess enough both tacit and codified knowledge and learning competences to achieve such a process innovation.<sup>19</sup>

The part/components standardisation project has led to positive effects in terms of learning and innovation.<sup>20</sup> First, standardisation leads to the shortening of lead-times in product development, which contributes to improving the time-to-market capability. Second, the project brings about a great deal of knowledge sharing and spill-over among teams, business divisions or even firms as the result of interactive learning occurring through the project. As expressed by a manager of the management team:

We expect the project to play a role in constructing learning by breaking the sectionalism and conservatism characterising LGE's corporate culture, through co-working between teams (L-1, 23 07/00).

The strategy seems to be working. For instance, LGE reported that since 1998 the

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<sup>19</sup> Interviews with a manager of the manufacturing team (L-6, 31/08/00), a senior manager of the manufacturing team (L-8, 29/08/00) and a manager of the DND Super A team, DDD (L-15, 22/08/00).

<sup>20</sup> Interviews with a team leader of Super A team, DDD (L-4, 12/08/00) and a manager of the production engineering team, DDD (L-5, 30/08/00).

VCR OBU reduced the number of parts and components needed for the production of VCR, from 995 to less than 22 and, as a result, it has obtained a cost saving effect of more than US \$ 40m a year (*Korea Electronics Times*, 3 March 1999). Encouraged by such performance, in early 1999, LGE established a committee for the standardisation of parts/components by division, in order to implement the task of standardisation from the initial stage of new product development. These activities have consequently led to the implementation of modular production methods in most of its domestic production lines.

The company has also been trying to introduce a cell production method, where one worker carries out most of assembly processes ranging from assembly to testing and even packing. It is recognised that this method may contribute to saving costs, by allowing the production of more than two models on a single assembly line. From the early 1990s, the company has sought to cope with the growing fragmentation of customer demand. The cell production method was first introduced in an LGE TV plant in 1995. Since 1997, it has been set up formally in all TV plants in order to produce new device-based TV models. The Digital Display Division (DDD) has adopted this method because the division produces a variety of device products and many of them can no longer depend on mass production. However, the adaptation of the cell production method in the TV plant is different from the original concept. In this plant, three or four workers become a team taking charge of the whole process of production instead of one worker doing it all. A manager of a manufacturing team explains:

We tested a cell production method over two years. The aim was to optimise it into the system of production appropriate for a specific character of this plant, before being put into practice. As a result, we came to find that the method shows better efficiency when three or four workers become one team for the whole process of assembly than one worker doing it all (L-5, 30/08/00).

The TV OBU<sup>21</sup> reported that the combination of both mass production methods and flexible production methods in the manufacturing process allows the concomitant pursuit of economies of scale and scope possible and has led to the cost cutting effects.

A manager of the manufacturing team said that:

Traditionally, we thought that productivity would only be improved by reorganising labour. However, as we have been successful in setting up cell production, we have come to change our mind on the concept of productivity (31/08/00).

According to him, by setting up a cell production method, the production line is reduced from 230m to 60m in length, while manufacturing productivity is improved by up to 20%. The cell production method, in addition, enables control the quantity of output. The cost of inventory management can be significantly decreased at the same time. In a nutshell, this means that productivity can, from the technological aspects, be improved by saving on all production costs, ranging from manufacturing costs to inventory management costs via the effective operation of the production system.

#### ***5.4. Spatial reorganisation of production***

Globally networked manufacturing firms attempt to cope with radical change by reorganising both the products they produce and locations where they operate. Common types of restructuring strategies in production are two-fold: in-situ restructuring and relocation. Economic geographers have long focused on spatial relocation or the closure of plants since these sorts of corporate behaviour can influence regional economies (e.g. Massey, 1984; Hayter, 1997). However, these may not necessarily be the first choice, because locational change is often a politically sensitive issue with a direct impact on the local society and economy. Therefore, the implementation of corporate strategies such as locational change could be influenced by multi-faceted, complex factors. Above all, manufacturing firms facing a crisis in profit

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<sup>21</sup> LGE calls 'sub-units' of each business division an OBU (Operating Business Unit).

tend to seek in-situ restructuring in response to change. If the situation gets worse, firms may try to undertake an alternative strategy, such as plant closure or relocation. However, the ways in which firms restructure productive organisations across national and global scales cannot be reduced to a simple factor. In reality, this is the outcome of multiple aspects dependent upon contextual specificity and contingency.

Let us explore the case of LGE. After the Asian crisis, LGE did not take radical actions, like plant closure. Rather, the focus was on the restructuring of the spatial divisions of labour between production sites on a global scale. First, all domestic plants were considered to have played a critical role as core nodes of the company's global production network. They provided overseas branch plants with sources of manufacturing knowledge as well as periodically carrying out on-the-job training programmes for local employees in overseas subsidiaries. A senior manager of the manufacturing department in the Kumi TV plant states:

Most of LGE's domestic plants are recognised, among business specialists, as reaching the world's best productivity level. How can that be? We have made great efforts to be the best over the last 25 years. I think it has been possible through reverse engineering, such as continuous benchmarking on best practices and ceaseless trial and error. Now the situation is reversed. We have come to possess many advantages over manufacturing technologies in which rivals may be difficult to imitate in light of tacit knowledge such as skills and know-how (L-8, 29/08/00).

Industry specialists I interviewed similarly expected that domestic manufacturing plants of Korea's top electronics manufacturers like LG and Samsung will continue to be competitive for at least the next decade, because their domestic plants have come to possess cutting-edge manufacturing technologies and know-how.<sup>22</sup> This knowledge may be hard for other companies to imitate, because such a largely tacit form of knowledge can be accumulated over many years from a mixture of both corporate-specific and national-specific institutional foundations, as illustrated by the literature on

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<sup>22</sup> Interviews with a director of the Kumi Chamber of Commerce (05/07/00) and a professor of Electronics in Kyungpook National University (29/06/00).



innovation systems (e.g. Edquist and Johnson, 1997; Gertler, 2000; 2001a; 2001b).

Thus, the company outlined a spatial restructuring strategy with two distinctive aspects. On the one hand, labour-intensive and low value-added production has been shifted to overseas plants, notably in China and Southeast Asian countries, operating to largely use cheap labour power and to penetrate local markets. Meanwhile, domestic factories concentrate on the products which are high value-added and high technology-based. This strategic move is clearly reflected in the following observation by the president of the DDD:

LG's domestic plants will play a central role in producing high-end products while factories in China and Southeast Asia will be set up as the strategic supply centre for the overseas market (*The Korea Times*, 31 January 2000).

Along with this, the company intends to set up lines for new products in overseas plants after mastering know-how to cope with unusual problems, which could potentially occur, by operating lines for new products in domestic plants.<sup>23</sup> This strategy is seen to take advantage of knowledge and competences accumulated in domestic factories. Domestic plants, as mentioned, usually outperform manufacturing practices elsewhere and retain well-educated human resources, as the source of skills and know-how. Second, only a few engineers and skilled workers have enough expertise for troubleshooting or problem-solving in overseas factories. This said, frequent, face-to-face interactions between multiple units, including the R&D team, the production engineering team and the manufacturing team, are required at the initial stage of setting up new production lines.<sup>24</sup>

If this is so, how do overseas plants solve on-going problems? When overseas plants face some technological problem which is difficult to solve, they usually ask the

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<sup>23</sup> Interviews with a manager of the management team, DAD (L-3, 20/07/00) and a senior engineer of the DND engineering department (L-16, 11/08/00).

<sup>24</sup> Interviews with an engineer of the DND engineering team (L-18, 01/09/00) and a team leader of Super A team, DDD (L-4, 12/08/00), and the author's direct observation.

engineering team in the domestic plant by email or telephone for a solution. A team in charge of advice on technological problems in overseas plants first try to find an answer from members who have associated knowledge and know-how. If they fail to solve the problem, they may try to review document files drawn up in domestic plants over a period of time. The procedure for problem-solving is discovering recursively underlying problems through combining tacit knowledge embodied in Korea-based engineers and codified knowledge in the form of documents related to trial, error and experiences. A manager of the engineering team in charge of technological issues in the overseas plants says:

Every morning, my work usually begins by reading emails sent by overseas plants. If they reported to us that they are faced with technological problems not identifiable by themselves, what I do first is to find workers who may have the best knowledge related to the problem. Jointly, they can find the right way to solve the problem. It may be possible because, I believe, domestic plants have experienced a number of trials and errors as well as accumulated know-how and skills enough to solve problems even at a distance, because we have developed and tested in advance the same technology on production and product (L-16; 11/08/00).

It implies that this is a set of knowledge that combines the distanced tacit knowledge, which is difficult to transfer into overseas plants, and the codified knowledge, which is not easy to access by others in terms of manufacturing technology. This organisational frame has made it possible for the company to shift its product lines to overseas, even if overseas plants show relative lack of expertise, skills and know-how. In addition, the shift of production lines involves interactive learning between domestic plants and overseas plants because overseas plants should acquire skills and know-how necessary to operate new manufacturing lines. Such learning is realised mainly through frequent business travels, telemediated or face-to-face meetings between domestic workers and overseas workers and on-the-job training of overseas workers in domestic plants.<sup>25</sup>

The Digital Display Division (DDD), for instance, completely shifted production lines

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<sup>25</sup> Interviews with a manager of the development support team, DDD (L-10, 03/09/00) and a senior engineer of DND engineering department, DDD (L-16, 11/08/00).

for medium and small-sized TVs (less than 17 inches) and TVCR models to Indonesian branch plants in 1999. These models are considered to be relatively low value-added. Instead of shifting such sorts of production lines, domestic plants focus on high value-added cutting-edge products. In this context, the Kumi TV plant has been focusing on producing high-technological and high value-added product models such as large-size flat TVs, TFT-LCD TVs and PDP TVs, all of which adopt new concept devices replacing the CRT (Cathode Ray Tube).

The Digital Appliance Business Division in Changwon (DAD) has more actively sought to shift production overseas. There are two reasons for this. First, the products the division produces are known to be more sensitive to local market conditions than any other consumer electronics goods. Second, home appliances are by and large those products regarded as technologically more standardised in both product and manufacturing technologies. That means emphasis is placed both on how to improve manufacturing productivity and how to save more costs. According to interviews with managers of the division's strategic management team, lower manufacturing productivity in overseas plants in the short-term can be compensated by the effect of saving costs – mostly coming from labour cost saving.<sup>26</sup> They believe that in the longer terms, obstacles such as lack of manufacturing skills and know-how, which may lower manufacturing performance, will decrease in overseas plants. Particularly, overseas plants operating in Southeast Asian countries and China show a rising learning curve on manufacturing technology and knowledge. Considering this fact, the DAD decided that domestic production bases should focus more on brand-new, large-size and domestic market-specific products in order to utilise the advantages of high productivity. For example, the division shifted all the existing washing machine models produced in the Changwon plant to a Thai plant in 1999. Instead, the Changwon plant produces brand-new washing machine models with a digital network function. The latest tendency of production restructuring in LGE can be summarised as: domestic plants concentrate on producing high-tech products, while products which reach at the mature

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<sup>26</sup> Interviews with managers of the management team, DAD (L-2, 14/07/00; L-3, 20/07/00).

stage in product life cycle are shifted to overseas production bases taking advantage of cheap labour costs.

### ***5.5. Reform of organisational structure***

This year I will allow each business division to have more independence at all levels of management, in order to establish an independent management system by the business division (CEO of LGE).<sup>27</sup>

This section draws attention to the changing features of organisational structure in LGE, in terms of the mobilisation of competences and a decision-making structure that would influence adaptability. As of the end of 2000, LGE is a diversified firm with four distinctive business lines. The company merged LG Information & Communication Company (LGIC), one of the electronics affiliates, in the second half of 2000.<sup>28</sup> Since the financial crisis, one of prime criticisms of the chaebol is that the power of strategic decision-making is excessively concentrated on the founder family and that this makes management practices less transparent. In this respect, LG also represents the typical characteristics of chaebol. At present, LG is still sticking to family-centred management, but there have been some tendencies in the direction of change; some attempts to give affiliates extended autonomy in all levels of management.

Until 1998, LGE possessed distinctive business lines and adopted an explicitly multidivisional form of organisation, whereas a substantial centre of power and strategic core functions remained under the control of the CEO and headquarters of the company. It was not a typical Chandlerian M-form at all (Chandler, 1962), even if it took an M-form. Under such a structure of organisation, roles played by each leader of a business division were highly constrained. As claimed by manager of the management team:

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<sup>27</sup> LG Electronics Company corporate release (1 January 2000).

<sup>28</sup> Thus, LGE came to add another business division, named Information & Communication Business Division (former organisations of LGIC except for marketing and management support departments). Accordingly, there are four business divisions with production functions within LGE.

In the past, there was very limited power in each business division. Actually, leaders of each production cluster composing a business division were respectively dedicated to aspects related to production (L-1, 23/07/00).

This kind of organisational structure and management system can pose serious difficulties of adaptation. First, it impedes effective local adaptation to changing markets. Second, it makes it difficult for the firm to build business-specific operating mechanisms in their own right. Third, since such a form of organisation, from a Williamsonian perspective, is closer to a U-form rather than an M-form, it necessarily entails a heavy burden for corporate CEOs (Williamson, 1975). It may cause difficulties in managing effectively all the business divisions that have distinct organisational competences and markets.

These problems have already been raised in the company, and top management leaders have increasingly recognised the need for reforming the structure of organisation relevant to pursuing economies of speed. However, they say that the group's leaders – implying the chairman, his family and relatives – are reluctant to let professional managers control the firms. One interesting example that illustrates such a suspicion. As described above, LGE, in the last half of 2000, absorbed LGIC, an affiliate of the LG group, producing mobile telecommunication equipment and providing wireless-telephone service. LG executives insist that:

The merger will be a win-win proposition for both companies. There will be plenty of cross-pollination of ideas in research and development as well as cost savings from joint marketing and distribution, especially in cracking foreign markets. And, it is predicted that the marriage will make the merged entity a major force in the global hi-tech industry, with sales of 30 trillion Korean won by 2003 (*Far Eastern Economic Review*, 3 August 2000).

In contrast, an electronics analyst argues that:

It is going against the global trend to specialise business along product lines [to maximise shareholder value] (*Far Eastern Economic Review*, 3 August 2000).

On the contrary, many specialists *ipso facto* suspect that the chairman's families would merge both companies with the objective to make control of their management easy.<sup>29</sup> Even if the above story goes beyond the discussion of organisational structure, I think that it would be helpful to understand the process of reforming organisational structure in a wider context.

In December 1998, LGE announced a reform of organisational structure with the focus on the empowerment and independence of management and decision-making operating in each business division. It seems that this attempt reflects the need for change in the contexts of both overall business environment change and the political-economic conditions surrounding the firm. As said by the company:<sup>30</sup>

LGE has decided to reform organisational structure [in a substantial sense] in order to rapidly respond to a radically changing management environment.

The main points are summarised as follows:

- reducing coordination functions that staff organisations in headquarters and overseas subsidiaries are in charge of.
- reinforcing the empowerment and authority of each business division at all management levels to improve speed of operating management.
- placing a focus on improving competences centred around production.

The company talked about 'companies within a company', allowing each business division to manage most management functions, including strategic planning and

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<sup>29</sup> A manager complained that:

I have heard convincingly that, after the determination of the merger, the former CEO of LGIC left the company, a professional executive who has nothing to do with the group's chairman and his family. He was devastated, because the chairman and his families made the decision through Koo and Huh families meetings without consulting him. And, he left a company to which he had devoted his enthusiasm as a founding member (L-10, 03/09/00).

<sup>30</sup> LG Electronics Company corporate release (Dec. 10, 1998).

overseas subsidiaries. The company would provide the leader of each business division with autonomy and responsibility in management. In turn, the leader of a business division should manage each division. Together, individual business divisions are allowed to have the authority to manage human resources in their own way. This includes job promotion, recruitment and lay-off.

However, it does not mean that business divisions will become completely independent. If business performance worsens or if profitability goes down radically, central headquarters will intervene. The decentralisation of decision-making proves to be critical if we recall that historically the company has geographically decentralised the structure of organisation. Geographical distance might lessen both rapidity and accuracy of decision-making, owing to the absence of frequent face-to-face communications between various levels of staff in the firm. According to interviews, leaders of each business division have come to make more time to discuss with various managers and share ideas and opinions with one another.<sup>31</sup>

Each business division has its own authority to control all functions, except the R&D function, which will remain under the control of the CTO (Chief Technology Officer).<sup>32</sup> This means that most functions, except for R&D, are consolidated in the heart of production organisation. But, it is interesting that while the function of strategic decision-making is radically decentralised, the R&D function comes to be more under control of the corporate headquarters. The company views that it is better to incorporate R&D functions under the control of the CTO, as the location of R&D is geographically decentralised.<sup>33</sup> Its aim is not only to coordinate effectively decentralised R&D functions but also to create synergies between R&D units. The reason is that as the increase of technological convergence needs more interactions between R&D functions, it is increasingly important for R&D teams for maintaining

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<sup>31</sup> Interviews with a manager of DND Super A team, DDD (L-15, 26/07/00) and a manager of the Development support team, DDD (L-10, 19/08/00).

<sup>32</sup> A top decision maker responsible for corporate R&D systems and technology.

<sup>33</sup> Interviews with a general manager of New display product lab, DDD (L-9, 06/08/00) and a manager of the Development support team, DDD (L-10, 19/08/00).

relational/organisational proximity.

In short, it can be seen that these tendencies towards the decentralisation of organisation have been sought as a way to respond to the economic crisis and a radically changing competition environment. It is expected that the changing structure of organisation, referred to as 'companies within a company', may contribute to fostering more corporate restructuring as opposed to when the company had a centralised structure of organisation, because leaders of individual business divisions are likely to try to do their best in order to improve managerial performance, notably in the short-term. What is clear is that the company, at a present, has a partially decentralised form of organisation. It seems to me however that the company will continue to evolve towards a more decentralised form of organisation.

## ***5.6. Restructuring domestic R&D activities***

### ***5.6.1. Regulating technological competences: domestic R&D system and the problem of proximity***

I believe that digital technology will have a significant influence on all areas of the electronics industry. However, personally I welcome such a radical transformation of technology in that I am sure that the best chance to gain market leadership is now. When we started this business, we did not have technologies and thus had to spend so much time and efforts learning to imitate technologies. However, technology has been radically moving towards digital technology away from the analogue. We have made great efforts to cope with such technological shifts. What is important here is to systemise developed or developing technological resources and to construct effective in-house infrastructure (CEO of LGE).<sup>34</sup>

For a competence-based perspective, R&D is of crucial importance for industrial firms, as it is considered to play a key role in both gaining and maintaining corporate-specific

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<sup>34</sup> *Korea Electronics Times* (7 January 1999).



technological capabilities for innovation. In addition, R&D capabilities can be a foundation for building absorptive capacity (Cohen and Levinthal, 1990), which is a prerequisite for obtaining important knowledge from outside the firm. These technological capabilities can be made more robust through both continuous strengthening of in-house R&D capabilities and vigorous technological networking with the outside. As far as the technological aspects are concerned, adaptation is to a large degree dependent upon how firms effectively mobilise their technological competences.

To begin with, the characteristics of R&D organisations in LGE need to be understood. While the company started with its own R&D activities from the beginning, it is difficult to say the company pursued formally organised R&D activities from that period. The focus of technological learning was exclusively based on ‘learning by imitating’ external knowledge, notably from Japanese technologies, and ‘learning by doing’ through repetitive trial and error (Ernst, 2000a; Kim, 1997). Formal research activities were begun in 1976, when the central R&D centre was established in Seoul (see Table 5.3). As of 2000, the company operates a global R&D network covering most domains of the electronics industry related to what it does (see Figure 5.2, Figure 5.3; Table 5.2).

Table 5.2 The role and objective of corporate R&D units

R&D unit	Role and Objective
<i>Group-wide R&amp;D Centre (LGEIT)</i>	<ul style="list-style-type: none"> <li>– Basic and applied research on electronics</li> <li>– Long-term research project</li> <li>– Cross-boundary research</li> <li>– Research on future-technology</li> </ul>
<i>Business Divisional Central Labs</i>	<ul style="list-style-type: none"> <li>– Focusing on future-oriented products and technologies</li> <li>– Developing the emerging new technologies</li> <li>– Leading technology standards</li> </ul>
<i>Product-specific Labs</i>	<ul style="list-style-type: none"> <li>– Developing part of new products and components</li> <li>– Developing a new product model</li> <li>– Improving an existing product model</li> </ul>

Source: LG Electronics Company.

Figure 5.2 Spatial distribution of sub-organisational units in LGE

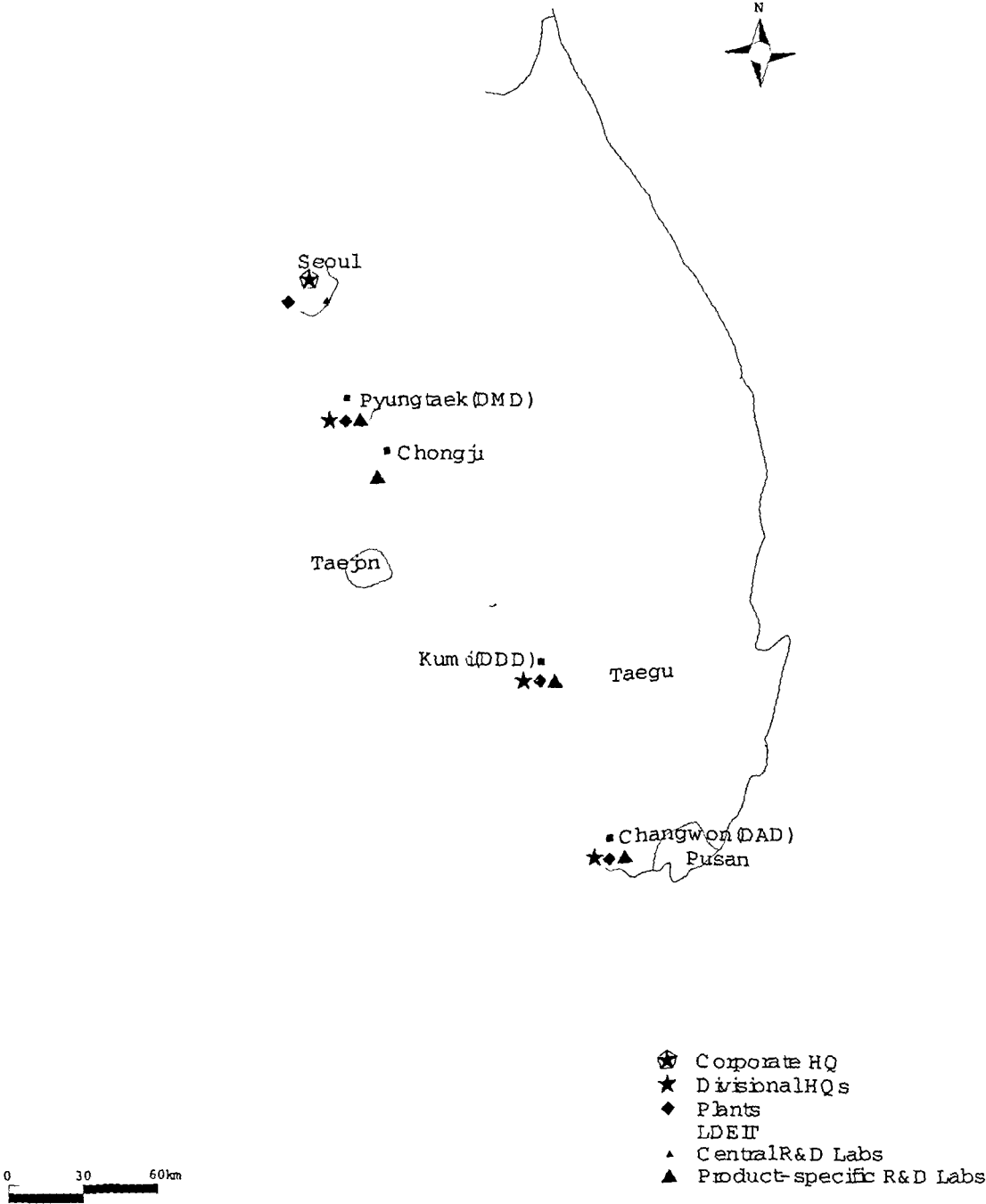
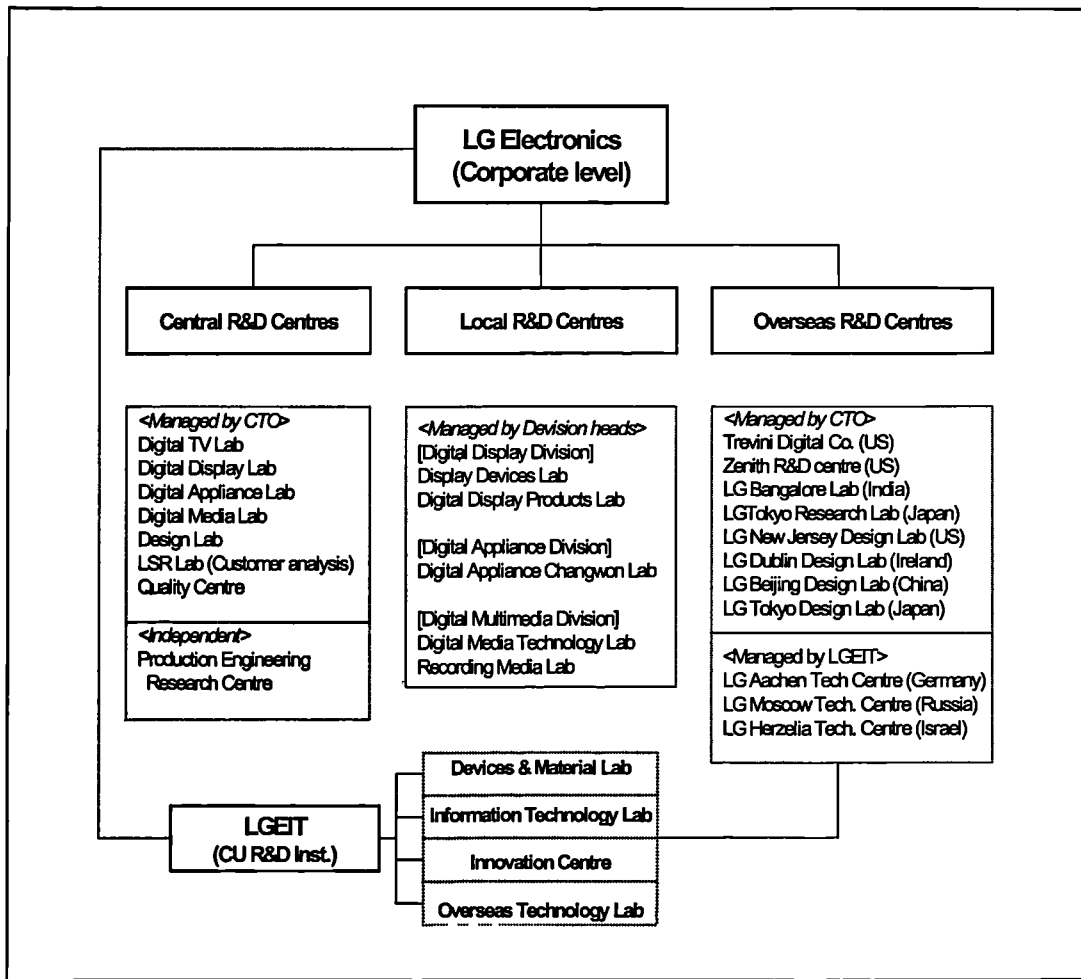


Figure 5.3 Structure of R&D in LGE



The company has a geographically decentralised form of R&D organisation. This is contrary to Samsung Electronics, the rival firm.<sup>35</sup> Such a spatial form is the result of fact that domestic production bases are geographically decentralised and distant from Seoul. Thus, the company has developed a segmented system of R&D, which consists of central R&D laboratories in a corporate-wide research complex based in Seoul and product-specific local R&D laboratories based in each domestic core production base.

The reason why the company has built this kind of spatial form of organisation may to some degree be understood by taking into account the spatiality of competences and knowledge. The operation of central R&D laboratories in Seoul is seen to give the company some distinctive geographical sources of advantage. Firstly, Seoul is known to have favourable access to sources of scientific and technological information and knowledge within the national boundary. The capital region retains the majority of public & private research institutions and leading universities. There is no doubt that the capital region is the most competitive place in Korea in the context of institutional thickness. Secondly, Seoul offers greater possibilities to recruit more qualified scientists, engineers and graduates. If we consider the importance of human resources in both sustaining and mobilising technological competences and knowledge, it is a crucial factor for firms, particularly Korean firms.<sup>36</sup> Thirdly, the operation of central R&D laboratories in Seoul allows LGE to keep close connections with the LG Electronics Institute of Technology (LGEIT), a central R&D unit for Electronics CU companies<sup>37</sup>, as they are all clustered together in a certain site in south Seoul, called the LG group central research park, established to foster synergy effects in research & development. LGEIT performs not only basic and applied research projects distinguished from central and local R&D laboratories, but also short-term joint projects with firm-level laboratories. LGEIT thus has a complementary relationship with firm-level R&D laboratories. As the group-wide R&D hub, LGEIT plays a central role in

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<sup>35</sup> For more details on Samsung Electronics Company, see Chapter 6.

<sup>36</sup> For more details, see the following section.

<sup>37</sup> CU (Culture Unit) is a term referring to a group of firms interrelated among affiliate firms within the LG group. The Electronics CU includes companies such as LGE, LG Innotech, LG-Hitachi, LG-Philips LCD and LG Electronics Parts.

coordinating research projects between similar R&D laboratories as well as in mobilising in-house technological competences.

Meanwhile, the company operates product-specific laboratories by business division. The purpose is to utilise the potential advantage that may be derived from the combination of R&D and manufacturing. According to interviews with managers of product-specific laboratories in Kumi, the co-location of R&D and manufacturing tends to be important at the stage of commercialising new products.<sup>38</sup> A new product development cannot be finalised until completing a series of tests on feasibility and manufacturability of the product. Such a process needs to use equipment and facilities in the manufacturing plant as well as to interact with engineers in the plant. In addition, the process of setting up a new production line requires frequent and intensive interaction and communication between different parties, including the R&D team, the engineering team and the manufacturing technology team.

This situational context is important to understand the latest changes in the composition of R&D units, notably since the crisis. The company has formally established four R&D laboratories since 1998, three of which were opened in 1998. In fact, all of the new laboratories were part of the existing R&D organisations. However, each of them became an independent R&D unit. That is because the company decided to focus organisational competences on the development of products based on the emerging digital technology, which is said to be core strategic business, such as display devices, digital TVs and multimedia products. The company wants each of the new laboratories to focus all of its competences only on its own technological area. Three of them were established in the LG group central research park in Seoul as part of central R&D laboratories. Only one of them is founded as a local product-specific laboratory within the Digital Media Business Division (DMD) plant in Pyungtaek.<sup>39</sup>

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<sup>38</sup> Interviews with director of Digital Network Division, DDD (L-12, 25/08/00), a senior engineer of New display device product lab, DDD (L-13, 01/08/00) and a manager of the Development support team, DDD (L-10, 19/08/00).

<sup>39</sup> Pyungtaek plant is the closest among all domestic plants, taking about an hour by train from Seoul. In fact, the local product-specific lab in Pyungtaek had already existed from 1984 with the name the

Table 5.3 Domestic R&amp;D laboratories (LGE)

Name	Location	Research areas	Estab.
LGEIT <sup>a</sup>	Seoul	Basic research in electricity and electronics (element materials, information technology, ASIC, and so on)	1975
Digital Media Lab <sup>a</sup>	Seoul	Optical storage technology, digital A/V technology and product development	1998
Digital TV Lab <sup>a</sup>	Seoul	Digital TV and ASIC technologies, and product Development	1998
Digital Display Lab <sup>a</sup>	Seoul	Display devices and application technologies (PDP, FED)	1998
Digital Appliance Lab	Seoul	Development of core components and technology for home electronics products	1987
Digital Design Lab	Seoul	R&D of Product design	1983
Quality Centre	Seoul	Research and analysis on product quality and reliability	1982
LSR Lab	Seoul	Research on product concepts through customer analysis	1989
Production Engineering Lab	Pyungtaek	R&D of production technologies (factory automation, system engineering and etc.)	1987
Digital Media Technology Lab <sup>b</sup>	Pyungtaek	Development of new multimedia products	2000
Digital Display Products Lab <sup>b</sup>	Kumi	Development of new display products (HDTV, Flat TV and etc.)	1984
Digital Display Devices Lab <sup>b</sup>	Kumi	Development of next generation display devices (PDP, Flat display, etc.)	1988
Digital Appliance Changwon Lab <sup>b</sup>	Changwon	Development of new products (air conditioner, Refrigerator and washing machine)	1984
Digital Recording Media Lab <sup>b</sup>	Chungju	Development of AV tape and optical disks	1975

Source: LG Electronics Company (as of January 2000).

<sup>a</sup> Clustered together with LG Electronics institute of technology in the LG group central research park in the south of Seoul.

<sup>b</sup> On-site laboratories established within focal factories.

Video research lab. The company dissolved the organisation to establish a new R&D lab to perform local-specific R&D on multimedia products in 2000.

However, we need to take into account the features of change in the spatial form of R&D organisation. Two of the newly established central R&D laboratories have a direct link to local laboratories of the DDD in Kumi in terms of the nature of research which they carry out. In the process of founding new laboratories, many of the engineers at local product-specific laboratories – about a third of all engineers – moved to new laboratories in Seoul.<sup>40</sup> Instead, the company reduced the function and organisation of the local laboratories. To surmount a lack of staff at the local laboratories, some engineers in the engineering team were shifted to the product laboratory, and in turn the engineering team decided to outsource routine work in order to cover a shortage of staff. Managers interviewed predict that this kind of R&D system will continue to remain, whilst the role of local R&D units will be decreased incrementally with the scale of minimum efficiency.<sup>41</sup> This prospect, however, can only be available when the company continues to keep in-house manufacturing activities without outsourcing manufacturing functions.<sup>42</sup> The following section tackles these issues in more detail, on the basis of in-depth interviews and several workplace observations.

### *5.6.2. The division of labour, learning and proximity*

This section illustrates the processes of organisational and technological learning occurring around R&D units and centres upon the relationship between the division of labour in R&D and proximity.<sup>43</sup> A particular concern relates to the influence of

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<sup>40</sup> Interview with a manager of the Development support team, DDD (L-10, 19/08/00).

<sup>41</sup> Interviews with a general manager of New display product lab, DDD (L-9, 06/08/00), a chief engineer of the DND engineering department, DDD (L-11, 26/07/00) and director of Digital Network Division, DDD (L-12, 25/08/00).

<sup>42</sup> For example, most recently the Sony Electronics company decided to outsource production activities and instead concentrate on only conception functions, such as basic and applied research and marketing, which are regarded as core competences.

<sup>43</sup> This section is based on interviews with managers of R&D and manufacturing teams: manager, the production engineering team, DDD (L-5, 30/08/00), general manager, New display product lab, DDD (L-9, 06/08/00), manager, the development support team, DDD (L-10, 03/09/00), chief engineer, DND engineering department, DDD (L-11, 26/07/00), director, Digital Network Division, DDD (L-12, 25/08/00), senior engineer, New display product lab, DDD (L-13, 01/08/00), senior engineer, Digital TV lab (L-14, 11/08/00), senior engineer, DND engineering department, DDD (L-16, 11/08/00) and engineer, Digital TV lab (L-17, 10/09/00).

proximity and place on interaction and learning between R&D units and between R&D and manufacturing, in order to understand recent organisational changes. The following description is based on the fieldwork survey in the Kumi TV plant of the DDD.

The DDD has three domestic plants, all of which have been based in Kumi in the Southeast of Korea since the late 1970s. The division is closely associated with two product-specific local laboratories in Kumi plants and two product-specific central laboratories in Seoul. The TV plant has a product-specific laboratory with more than 130 engineers and the engineering team (140 engineers), the manufacturing technology team (70 engineers) and the manufacturing team. The engineering team is closely related to the R&D laboratory in the nature of its work. It usually performs engineering tasks, needed for linking new products to mass production, as well as for handling technological problems with and improving the existing products. The product-specific laboratory and the engineering team intersect at the boundary of their work in many ways, and sometimes they interchange members of the staff. Thus, I shall here treat it as part of the R&D unit.

The central Digital TV Laboratory (hereafter, the central laboratory) actually performs research projects in a broad range of basic and core technologies associated with digital TV. Meanwhile, the role of the TV laboratory in the manufacturing site (hereafter, the local laboratory) is as follows: the development of display device parts; the development of products at the commercialisation stage; and the improvement and modification of the existing products based on analogue display technology.

Let me explain an example associated with the development of digital TVs. To commercialise a brand-new product, more than a quarter of the staff members at the central laboratory in Seoul join the local laboratory in the Kumi TV plant. In general, they stay at the local laboratory for 3 to over 6 months until completing the test of a new product and set-up of the production line. During this time, a lot of interactions and



communications between the two are needed. Additionally, some of the local laboratory engineers are sent to the central laboratory in the course of developing a new product. Such a mutual exchange of people between the central laboratory and the local laboratory tends to be further encouraged at the final stage of commercialisation. In terms of technological learning, these interactions are intensified in a way that technological interdependence can be increased. That is to say, staff of the local laboratory may acquire knowledge on basic technologies that the central laboratory has developed and accumulated and, at the same time, staff in central laboratory may understand overall processes, ranging from the development of products through engineering works to manufacturing, and learn product-based technologies that the local laboratory specialising in applied technology possesses. The local laboratory in Kumi has long accumulated a variety of competences in the form of both tacit knowledge, such as know-how and skills, and codified knowledge, such as research files. R&D engineers interviewed argue that technologies associated with digital display products are not completely separate from analogue based technologies. Rather, it may be more effective when both technologies are incorporated complementarily.

This technological non-discontinuity between both technologies is of critical importance when we consider the ways in which firms adapt and learn in technological discontinuities. That is because the strategic move to digital-based technology and products may also, to a greater or lesser extent, be dependent upon an existing technological base. This feature challenges some ideas on corporate adaptability and technological discontinuity. There is an idea that large firms show strong performance by seeking scale economies during the phase where technologies evolve at an incremental pace, whilst they are likely to lose their advantageous positions in technologically changing conditions due to their path-dependence in both technology and organisation (McKelvey and Texier, 2000). However, such an idea ignores the complex and continuous nature of changing technological attributes. It cannot be viewed that knowledge and competence accumulated at the product-specific laboratory are obsolete. Rather, the local laboratory can play a critical role in accessing new

technological knowledge more swiftly by mediating between an emerging digital technology and an existing analogue technology. Assets of organisational knowledge and competences embedded through incremental learning over a long period of time can be a valuable source necessary for sustaining innovation in products.<sup>44</sup>

Let us move back to an explanation of the interactive tie in LGE between the central laboratory and the product-specific local laboratory. This relationship implies frequent, interactive communications and learning from one another. In doing so, communication methods such as email and telephone are utilised conventionally. The use of ICTs is likely to be increased with the help of the rapid progress of ICT technology. According to head of the local laboratory, the company is also considering interactive video-teleconferencing, in order to make communications between decentralised R&D units more effective (26/07/00 interviewed). He recognises, nevertheless, that these methods for distant communication may not be sufficient to resolve technological problems and issues, as well as to share knowledge one another. The sharing of know-how and the coordination of cognitive distance between distant R&D teams are considered to be critical aspects in the process of the R&D project, and these may only be effective through improving relational/organisational proximity on a face-to-face basis.<sup>45</sup>

Thus, engineers of both laboratories in charge of a certain project often gather in a suitable place to solve problems at a given point in time, or until completing joint-projects. However, the problem becomes more complex when a task must be carried out at a local laboratory but needs co-working between local lab members and central lab members. If it is a short project (less than two weeks), the central lab staff may not go back home during the project. If the project is, however, a long-term project (over a month), they may go back home once every week or two weeks. Throughout this time, staff members of the central lab and the local lab establish common values, mutual

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<sup>44</sup> Helfat and Raubitschek (2000), on the basis of the case of some Japanese electronics companies, also illustrate that the success of radical learning can be dependent upon ideas and assets accumulated through incremental learning.

<sup>45</sup> See Rallet and Torre (2000) for an example of the empirical research supporting this view.

understanding and common sense. These elements of relational/organisational proximity constructed as a result of the process of making connections between engineers can be a basic condition for working together effectively as well as to sustain interactive learning. It implies that building organisational proximity seems to be, to greater or lesser extent, influenced by spatial proximity. Conversely, once different parties at a distance gain organisational proximity through continuous co-working activities, difficulties in interaction and communication between them can be mitigated.

There is some problem that the nature of organisational ties between workers within the company is not as strong as the frequency of contact and interaction between workers. However, it is hard to say that this characteristic is one that is found only in this company. It may reflect Korean organisational culture, steeped as it is in hierarchical order and obedience to one's seniors (Fukuyama, 1995). However, this kind of cultural characteristic may be used to regulate and control individuals, teams and sub-organisational units who may have different interests. A senior engineer of a local laboratory states:

The spatial separation of R&D units should make it difficult for us to interact and communicate with the staff of the central laboratory as well as to coordinate tasks between local and central labs. Quite often, members of the staff at both labs must undertake business travel to meet their counterparts. Workers who have been working for a long time, like me, may have thought that this is part of the work routine given to us from the start of joining the company. But, recently joined young engineers tend to increasingly complain about that problem. More seriously, young graduates are increasingly unwilling to work at local labs located in non-capital regions (L-9, 06/08/00).

The corollary of this is that the focus of corporate R&D investment has increasingly been moving into Seoul. This may be viewed as going against the latest academic fashion on innovation. According to the literature on geographies of innovation, the post-Fordist mode of innovation requires the interactive flow of knowledge and innovation. In this context, the spatial integration between manufacturing and R&D becomes critical (Cooke and Morgan, 1998; Hayter, 1996; Kenney and Florida, 1993).

LGE's managers interviewed, in principle, agreed with a logic advocating spatial integration of manufacturing and R&D. Nevertheless, they argue that LGE's movement towards a spatial separation of manufacturing and R&D does not necessarily mean the one-way circulation of knowledge, or a disadvantage to the innovation capabilities. As argued by a senior engineer in a product-specific laboratory in Kumi:

In the course of basic research and the development of a new product, the interaction between R&D and manufacturing would be less critical. Rather, for the development of an existing technology and the improvement of established technology, more frequent interactions and communications may be required at corporate-wide level (L-14, 11/08/00).

A head of the central D-TV laboratory demonstrates a crucial rationale of this view:

A key element of Digital TV is a digital chip-set [based on ICT and semiconductor technology] and the competitiveness of D-TV is not dependent on its manufacturing capability, but exclusively on its design capability (*Korea Electronics Times*, 18 January 1999).

A former engineer who had worked until recently in the Digital TV laboratory says:

For digital electronics goods such as Digital TVs and digital media, the importance of manufacturing seems to be no longer significant. Only R&D capability will remain crucial for determining corporate competitiveness. That is because the size of commodities becomes smaller as well as those commodities being composed of fewer and smaller parts. These commodities seem to require a less complex process of manufacturing than analogue ones (L-17, 06/07/00).

Jointly, they think that R&D activities can be sufficiently pursued without co-location with manufacturing and more crucial is to intensify interactions among R&D staff. In their view, interactions between R&D and manufacturing would be needed when attempting to commercialise new products as it is critical for the firm to realise rapid time-to-market and the optimisation of a new product and production line. The flow of knowledge and learning may be constructed through more complex organisational

processes than might be generally assumed. Thus, the functional units of organisation such as R&D, manufacturing, design and marketing may not have a precise boundary between them.

It is therefore difficult to argue that the changing patterns in the form of R&D organisation imply a return to the Fordist linear R&D model, which is characterised as a top-down, one way flow of innovation and learning and the precise division of labour between R&D groups. Basically, R&D units have all their own R&D areas. However, this does not necessarily mean that their tasks and roles are clearly departmentalised or their knowledge flows are unidirectional. As illustrated throughout this section, in many ways interactive relationships are sustained through boundary-spanning, co-working activities. The processes of interactive learning based on frequent, in-depth interactions and communications between the central lab's staff members and people in local plants, not least the local lab, play a crucial role in avoiding a one-way direction for innovation.

What is clear is that central laboratories play a key role as a mediator linking business divisional R&D laboratories to LGEIT, whilst local laboratories (including engineering departments) act as a bridge for combining the rest of the teams/departments involved in production activities. On the other hand, an obvious trend in the R&D domain, which has recently occurred in LGE, is that the priority of corporate R&D performance have been placed increasingly upon central R&D units, away from the geographical integration between R&D and manufacturing. These characteristics appear conceptually paradoxical, but it should be understood that such a spatial form of R&D reflects a corporate-specific mode of regulating organisational competences.

### ***5.7. Globalisation of R&D activities***

In general, the globalisation of R&D activities by large Korean electronics firms took place in the early 1980s. In the early years of overseas R&D, R&D activities focused on narrow fields, concentrated on following up Japanese technologies, and were limited to a few countries (Kim, 1997). That is to say, Korean firms, in that period, operated overseas R&D in order to catch up and imitate an existing knowledge already developed in advanced countries and leading firms. However, since the early 1990s they have been increasingly operating overseas R&D activities in order to exceed competing firms in terms of both technology and market competition. Korean electronics firms such as LGE and SEC (Samsung Electronics Company) have similar purposes for operating overseas R&D centres. Some main purposes are:

- to analyse the market trends of host countries.
- to develop market-specific products to meet local customer demands.
- to collect information on the trends of technological development and progress in competing firms and research institutions in technology-leading countries in general and North America, Western Europe and Japan in particular.
- to have access to and learn advanced technologies and knowledge developed in host countries.
- to recruit both qualified graduates with higher degrees from top engineering and business schools in the US, Europe and Japan and highly-qualified scientists, engineers and managers working in leading and competing firms globally.

Let us examine the LGE experience of globalisation of R&D. As illustrated in Table 5.4, in January 2000 the company operated 11 overseas R&D centres. The first was the Tokyo R&D centre in Japan in 1981 learning Japanese technologies. Then, most of the overseas R&D centres have been built since 1990. Apart from R&D on product technology, the company has continued to found since 1991, a global design network encompassing four design centres in Dublin (1991), Tokyo (1993), New Jersey (1994) and Beijing (1999). The Beijing design laboratory was added to cope with a rapidly

emerging Chinese market. This tendency that product design R&D laboratories are increased will continue, because LGE has decided to improve product design capabilities as one of its core competences.

Of particular interest is that the company has opened five overseas R&D centres since 1998. Of these, the Zenith R&D centre in Chicago was created through a complete merger with the Zenith, a former US TV maker. In addition, the geographical scale of R&D operations has been increasingly globalised. LGE has the intention to secure geographical advantages in host countries or regions with technology-leading firms, R&D institutions and a pool of qualified human resources. The places include Princeton in New Jersey, Chicago in Illinois, Dublin in Ireland, Aachen in Germany, Tokyo in Japan, Moscow in Russia, Herzelia in Israel, Bangalore in India and Beijing in China. Many of them have been founded in order to research local market-specific product design. All places where the company forms global R&D networks are said to retain national or local-specific advantages in certain areas of technology.

Let us take some examples from overseas R&D laboratories that have been established since 1998.<sup>46</sup> In April 1998, the company established a 'Software Development Centre' in Bangalore of India, a well-known ICT cluster (Fromhold-Eisebith, 1999). The aim was to access IT-related knowledge and information as well as to utilise a low-cost but high-quality brain pool. Subsequently, the company founded a European R&D centre, called the LG Technology Centre of Europe, in Aachen of Germany. The aim is three-fold: access to regional-specific technological knowledge and expertise; collecting information on European technological trends; and recruiting highly qualified European experts, particularly German engineers. The company recognises excellent R&D infrastructures as the regional advantage of Aachen.

As illustrated above, there is a clear tendency for LGE to attempt to actively exploit local-specific advantages in taking the global R&D strategy. What is noticeable is that

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<sup>46</sup> LG Electronics Company corporate release (14 July 1998).

five of the overseas R&D centres were founded immediately after the outbreak of the Asian crisis. The question raised is why the company has set out to aggressively expand overseas R&D operations, in spite of the economic crisis. The rationale is two-fold.<sup>47</sup> On the one hand, there has been increasing global competition among leading electronics firms to secure an emerging digital electronics market, notably the Digital TV market. On the other hand, a greater necessity for access to advanced new technologies and knowledge of digital products has been emerging, as LGE has strategically decided to venture its fate on emerging new business domains such as digital TVs and digital multimedia.

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<sup>47</sup> Based on interviews with a manager of the management team, DDD (L-1, 23/07/00) and a manager of the development support team, DDD (L-10, 19/08/00).



Table 5.4 Overseas R&D laboratories (LGE)

<b>Name</b>	<b>Location</b>	<b>Research areas</b>	<b>Estab.</b>
Zenith R&D Centre	Chicago, U.S.	Development of VSB and digital transmission technologies	1999
Trevini Corp.	New Jersey, U.S.	Development of Digital TV technology	1996
New jersey Design Lab	New Jersey, U.S.	Design of product models for the North American market	1994
Dublin Design Lab	Dublin, Ireland	Design of product models for the European market	1991
Aachen Tech. Centre	Aachen, Germany	Collection and analysis of European technologies	1998
Bangalore Research Lab	Bangalore, India	Software development	1998
Beijing Design Lab	Beijing, China	Support of the development of product design for the Chinese market	1998
Tokyo Research Lab	Tokyo, Japan	Localised R&D and the technology analysis of Japanese electronics industry	1981
Tokyo Design Lab	Tokyo, Japan.	Analysis on the product design trend of Japanese electronics makers	1993
Moscow Tech. Centre	Moscow, Russia	Collection and analysis of technological trend in Russia and CIS, and software development	1995
Herzelia Tech. Centre	Herzelia, Israel	Collection and analysis of technological trend in Israel	1999

Source: LG Electronics Company.

The company emphasises that:

We have a plan to intensify corporate-wide activities in technological learning and innovation to cope with the rapidly emerging digital electronics competition and in turn to secure the position of a global leader.<sup>48</sup>

The evidence can be found in the fact that the central purpose of establishing overseas R&D centres recently has been to develop technologies in digital TVs and multimedia (e.g. the R&D centres in Chicago, Bangalore, Herzelia and Aachen). For example, the function of the hub R&D centres in New Jersey, USA, and Tokyo, Japan, have been focusing more on developing new technologies such as digital TV, digital home network and digital media.

Accordingly, it has become more crucial for the company to develop and secure rapidly emerging digital electronics technologies than ever before. As the company has centred most of its core tasks in R&D on those technologies, it is not surprising that in recent years the company has aggressively invested in the operations of global R&D centres.

One interesting story illustrates an attempt by LGE to change the geography of its US R&D centres. After taking over Zenith in 1999, the company initially planned to close down the Zenith Chicago R&D centre and move its function and employees to the LG New Jersey R&D centre in order to save operating costs. Some employees would have been laid off in the course of the location shift. However, the company came to find this was a dangerous plan and promptly cancelled it. As indicated by a manager of the TV lab:

On the one hand, local staff in Zenith R&D were reluctant to move their workplace to New Jersey for various reasons. We were worried about the possibility that they would leave their workplace for that reason. As they possess a great deal of expertise necessary for developing Digital TVs, LGE would be likely to get incur damage if they

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<sup>48</sup> LG Electronics Company corporate release (7 January 1999).

stopped their research. On the other hand, there is plenty of knowledge in the form of formal knowledge in general, and tacit knowledge in particular (L-10, 19/08/00).

The company's attempt for geographical reform of R&D operations was undermined by the spatial fixity of knowledge assets. This case indicates that the value of assets such as R&D seems less dependent on the value of physical assets than that of knowledge and intellectual assets, particularly in the tacit form embodied in humans. Currently, Zenith R&D centre is recognised as one of the most important repositories of knowledge and technology in the company.<sup>49</sup> A key factor for LGE to get confident of leading the global Digital TV market and its technology is the technological competence of the Zenith R&D centre. In fact, Zenith retains various core technologies, including a US patent for VSB (Vestigial Side Band), an industry standard technology for digital broadcasting transmission systems. The company has thus actively attempted to mobilise internal R&D competences to take advantage of the technology and knowledge that the Zenith R&D centre has accumulated. As indicated by a senior engineer:

We are proud that we have constructed strong foundations in applied technologies so far. But, in reality we are not so strong in substantial core technologies. Therefore, we are trying to do our best to secure core technologies. In this sense, we believe that the Zenith R&D centre plays an important role in a way in which we learn and develop the core technologies of Digital TV (L-13, 01/08/00).

In addition, they are confident of securing their own competences to lead digital TV technologies in the near future. The reason is two-fold. First, they have strength in applied technology, which implies that they have previous ability to acquire advanced technology rapidly. Second, they make intensive effort through harder working (Janelli, 1993). Both are assumed to be crucial factors consisting of absorptive capacity for learning (Cohen and Levinthal, 1990; L. Kim, 1998). These aspects of absorptive capacity reflect by and large the evolutionary paths and routines of the company. As one means of sustaining this, the company regularly sends staff at

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<sup>49</sup> Interview with a manager of the development support team, DDD (L-10, 03/09/00).

domestic R&D laboratories to the Zenith R&D centre.

This case shows that ‘grafting’, which is identified as a way of learning external knowledge by acquiring knowledge intensive organisations or hiring new knowledge retainers, can be a critical means to improve organisational knowledge and competences. In particular, this means could be more effective if attempting to quickly acquire complex forms of information and knowledge (Huber, 1996). However, the effectiveness may depend on absorptive capacity or a prior base of knowledge and competence.

An important activity that overseas R&D centres perform, most particularly US-based R&D centres, is to recruit highly qualified engineering and management experts from host countries. The company is suffering from a lack of qualified engineers and graduates, like many other large Korean firms. However, it is generally considered that LGE has been a bit inferior to SEC in terms of both the quantitative and qualitative composition of R&D staff. In part, this may result from the fact that qualified graduates tend to prefer working in SEC to LGE. They conventionally believe that Samsung gives them better incentives and chances to promote their career.<sup>50</sup> LGE thus has recently made great efforts to secure qualified experts and graduates from advanced countries in general, and the USA in particular.<sup>51</sup>

In the past, the company operated overseas R&D centres to sustain relatively simple and limited goals, such as the collection of information and the imitation of technology. However, the company has recently attempted to further the localisation of R&D activities. For example, there is an increasing tendency that each overseas R&D laboratory undertakes its own projects, and often carries out a joint project with local companies or research institutes. The transition towards localisation is coherent in part

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<sup>50</sup> Based on interviews with workers of both companies and the author’s indirect experiences.

<sup>51</sup> Most of those who the companies attempt to headhunt are Korean overseas students with Masters and PhD degrees or Koreans with high technological or managerial ability in leading global firms. This is because they speak the same language, which means there is no problem with communication, and they understand Korean culture and the Korean firm’s organisational culture.

with the increase of inter-firm cooperative alliances, such as joint product development. Despite the tendency for the company to increasingly globalise its R&D base, it is expected that domestic R&D function will remain the global hub of corporate R&D network and technological competences<sup>52</sup>. This strategic orientation of the company is largely similar to other TNCs (Pavitt and Patel, 1999).

### ***5.8. Inter-firm alliances***

Since LGE has secured technologies for the world's leading display devices and digital products, the company will form strategic alliances with foreign partners to establish its brand power as a global player (President of LGE's Digital Display Business Division, *The Korea Times*, 31 January 2000).

What one of the top executives says above illustrates clearly the company's business strategy. He goes on to argue that the company is now competing with global leaders in the digital display sector on an equal footing and is speeding up its development for the next-generation products such as Digital TV (*ibid.*).

Along with this strategic move, the company has sought to form strategic alliances with major global players in a given market and technology. There are various reasons that firms form alliances and there are various definitions of strategic alliances. In brief, I use the term as a form of reciprocal agreement between more than two partners seeking to continue to survive, or to be more competitive, by sharing competitive resources such as knowledge and assets with counterparts. Recent theories on the firm have tended to stress the existence of complementary assets between partners as a key factor of strategic alliances. In particular, the competence-based perspective focuses on the formation of inter-firm alliances in the context of the complementary combination of distinct competences between firms (Nooteboom, 1999). Here, I do not want to deal with detailed processes and mechanisms of strategic alliances taken by Korean firms.

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<sup>52</sup> LG Electronics Company corporate release (30 January 2000).

Instead, I pay particular attention to understanding recent patterns and characteristics of strategic alliances that Korean electronics firms such as LGE have taken in response to environmental pressures, or to solidify a corporate-specific strategic direction.

As illustrated in Table 5.5, LGE has been constructing partnerships with leading firms in a wide-range of electronics & ICT industries. The significance is that most of the alliances have been made since 1998. This implies that the company is no longer a technology or market-follower, as it has come to accumulate unique competences in certain product markets or technologies. The forms of inter-firm alliances entered by the company are divided into joint venture and technological partnerships.

The company looked for companies interested in investing in some of its core businesses after the economic crisis. It was important for the company to attract a large amount of investment. This is in part because the government urged the company to lower radically its excessive debt-equity-ratio, but also because the company wanted to secure a source of revenue needed for investing in new strategic businesses such as Digital TV and digital home networks. In the end, LGE reached an agreement with Philips, a Dutch-based electronics firm, to set up joint ventures for TFT-LCD in 1999 and for CRT in 2000 respectively.<sup>53</sup> Both the CRT and LCD businesses that were agreed as a joint venture are said to show a saturated or fluctuating global market structure. Thus, LGE needed to form strategic alliances.

It is reported that both companies are planning to form strategic alliances in other businesses, such as PDP and mobile phones, on the basis of successful partnership in LCD joint venture (*Hankyung Daily Business*, 28 November 2000). Trust and mutual understanding between alliance partners, obtained via the experience of LCD joint venture, may have given an additional opportunity to collaborate. This is indicated by previous research findings that a history of successful ties between alliance partners generates trust (Inkpen, 1996).

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<sup>53</sup> In consequence, the joint venture businesses of both firms have come to be the top players in the global market share.

Table 5.5 Major interfirm alliances (1996~2001.1)

Partner	Form	Area	Goals	Estab.
IBM (US)	Joint venture	PC production and sales in Korea	Combining IBM's technologies and brand power and marketing advantage of LG in the Korean market	1996
PBS (US)	Strategic alliance	Digital data broadcasting	Succeeding competition for the standardisation of digital data broadcasting system → Success in developing unique standard	1998
Philips (Holland)	Joint venture (50:50)	TFT-LCD	LG attracting foreign capital Philips expanding production bases → Expected to be expanded to other areas of display products	1999
Tessera (US)	Strategic alliance	PCB (Print circuit board)	LG developing advanced technology and commercialise earlier than competitors Tessera securing production facilities	1999
Oak (US)	Strategic alliance	Chip components of optical storage devices	Combining LG's strength in optical storage device system technology with partner's chip component technology → Agreement on technology sharing and joint development of core components	2000
Microsoft (US)	Strategic alliance	Home network	Coping with jointly competition for the standardisation of home network system	2000
Erickson (Sweden)	Strategic alliance	Mobile communication equipments	Exchanging complementary technological competences between both companies	2000
Hyundai (Korea)	Strategic alliance	Semiconductor chip	Securing supplier for DRAM chip in the long-term Utilising distinct technological advantages one another	2000
Intel (US)	Strategic alliance	Semiconductor chip for digital electronics	Technological cooperation, sharing of intellectual property, long-term transaction in semiconductor chip	2000
Lucent (US)	Strategic alliance	Mobile communication devices	Advancing the competition for developing the next generation mobile communication devices	2000

*Continued*

Hitachi (Japan)	Joint venture	Optical storage devices (CD-ROM, CD-RW, & DVD)	Sustaining market leadership through combining LG's global marketing capability and partner's technological leadership	2000
Intel (US)	Strategic alliance	D-TV data broadcasting, home network & Internet-based appliances	Developing jointly new products in ahead of competitors Coping with jointly the competition for the standardisation of digital technology system	2000
Philips (Holland)	Joint venture (50:50)	CPT and CRT	Pursuing complementarities in technological competences, marketing and production areas, to keep their competitiveness in saturated market	2000
Matsushita (Japan)	Joint venture	Air conditioner	Sharing sales network and technology (For more details, see Table 5.6)	2001

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*Sources:* based on LGE Annual Report (1999, 2000); *Korea Electronics Times*; *Korea Daily Business* (1 January 1998 ~ 30 April 2001).



Most recently, the company has formed a joint venture with Matsushita. It aims to sustain a leading position in the global air conditioning market. Both companies have the first and the second largest market share respectively.<sup>54</sup> A strategic alliance between the two involves wide-range cooperation, including production, marketing, R&D, production technologies and sourcing. Basically, the rationale of this joint venture is mutual complementarity in core competences between both companies. LGE is very competitive in applied technology and production technology, whereas Matsushita is a leading firm in core product technology (*Hankyung Daily business*, 17 January 2001). As summarised in Table 5.6, it is expected that both companies will continue to manage a leading position in market and technology of air conditioner as they have agreed to combine each one's distinct core competence (*ibid.*).

Table 5.6 Details of LG-Matsushita strategic alliance

Sector	Details of collaboration	Goals
<i>R&amp;D</i>	- Joint research on core technologies	- Leading technologies - Creating technological synergy
<i>Sourcing</i>	- Joint purchase of key parts - Interchange of information on materials and parts	- Cost saving
<i>Marketing</i>	- Joint marketing using global production networks specialised one another	- Increasing market positioning - Interchange of marketing know-how

Source: based on *Korea Daily Business* (17 January 2001)

In short, common features can be found from the recent joint ventures of LGE. Firstly, products agreed for joint venture are in a domain which is characterised by growing technological standardisation and market saturation (display devices such as LCD and CRT, and air conditioners). Secondly, allied companies are leading global players within the top five of their global market share. The firms involved have chosen this

<sup>54</sup> LGE has 14% of global air conditioner market share and Matsushita has 12% of it.

strategy to secure their monopolistic positions in a given market.

Apart from partnerships through joint venture with a focus on production, recently the company has also aggressively formed strategic partnerships with major technological leaders. Once again, most of the alliances have been made since 1998 and focus on digital technologies such as Digital TV, home networks and multimedia (see Table 5.4), indicating clearly the company's strategy:

In particular, with focus on digital management moving towards becoming first mover in the market and leading the industry standard, LGE is concentrating on strengthening strategic alliances in the digital TV industry.<sup>55</sup>

Most major alliance partners are US-based firms and specialise in the fields of digital TV and ICTs. All of the alliances have been made to win the competition to secure leadership in an industry standard for digital TV and home networks. It is known that alliance partners choose LGE because the company retains production capability, applied technology, and digital TV technology. It is expected that this tendency will be accelerated in line with the movement of global strategic alliances to take the leadership in the competition for the swiftly approaching digital electronics market. Therefore, the prospects of the firm is likely to depend on whether it is capable of securing leading-edge technologies earlier than competitors by both mobilising and combining internal competences and external competences.

### ***5.9. Building a learning-oriented organisation***

The recent literature on learning argues that learning is likely to occur through interactive and complex social processes encompassed within and outside of the firm. However, it cannot be viewed that such processes are constructed either solely by informal interactions and communications communities of practice, or just by formal

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<sup>55</sup> LGE corporate release (30 January 2000).

organisational units. Learning in organisations takes place in complex ways across both formal and informal boundaries. The first part of this section reveals the limits to informal learning and suggests the importance of social learning. The second part deals with ways of learning on the basis of *ad hoc* organisations, task-force teams. A task-force team is considered to be important in the context of learning and problem-solving.

#### ***5.9.1. Limits to everyday learning and facilitating epistemic communities***

Some writers as we saw in Chapter 2 propose that learning in doing occurs through daily practice and it is seen as a vital source of both routine and strategic learning through interaction, and everyday actions bring together tacit and formal knowledge (Amin, 2000; Wenger, 1998, 2000). For them, communities of practice are central to such everyday learning.

Throughout this chapter, I have tried to highlight learning centred upon R&D teams, emphasising learning occurring in the context of particular formalised organisational processes. In this section, I point out some difficulties that hinder learning via everyday practice in the workplace. In turn, it tries to show the ways in which the company attempts to activate epistemic communities in order to improve organisational milieu and competence as well as to cover lack of learning through communities of practice.

This account is based on a series of interviews with managers in R&D and manufacturing teams and the survey on R&D and organisational culture recently carried out by the innovation team of the DDD. LGE workers generally recognise a lack of corporate routines that encourage informal learning among peers or between workers beyond formal units of organisation. There are some factors that constrain the opportunity to make inter-personal interaction and communication possible. Basically, workers complain that working conditions with tight daily routines and long working

hours make it difficult for them to share experience and know-how at work.<sup>56</sup> In some cases, workers are not even aware of what peers next to them do. Sometimes, workers have difficulty understanding one another because the company too often changes organisational structure by forming new teams or breaking up established teams. Since workers, as a result, must adapt to an unfamiliar organisational environment and tasks, it may not be easy for them to create communities of practice because it takes a long time to create them. Moreover, LGE's hierarchical culture is one of the underlying factors restricting the activation of communities of practice. According to Lam (2000), a large bureaucratic organisation tends to reduce the possibility of distributed tacit knowledge to emerge, by focusing on formalising and institutionalising organisational routines and knowledge. In such circumstances, it is not likely that social learning based on informal interaction and communication between workers is active. However, this does not mean that workers in the company do not interact and communicate with each other in an informal manner or create communities of practice. In the course of carrying out an interview with a manager of the organisational innovation team, I found an interesting example where informal social learning leads to radical learning.<sup>57</sup>

One of the R&D teams came to face with an uncertain problem in the middle of carrying out their project, which was part of a major project for developing a new device. They first tried to resolve it by modifying the procedure and method of experiment. Next, they reviewed scientific references and research files. However, they failed to solve the problem by themselves. Thus they convened a series of meetings in which all of the members involved in that project participated. A variety of ideas came out from participants. They tried to solve the problem by adopting some of these ideas that seemed to be valuable and feasible. But they failed to resolve the problem. Members got frustrated and stopped the project. Some days later, one of

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<sup>56</sup> Through a longitudinal fieldwork on a Korean chaebol company, Janelli starkly shows working conditions in Korean big companies to be long working hours and hard work (1993: 203-228). On the other hand, Moon (2000) points out the way in which lack of time to spare in working hours prevents generating innovative culture in R&D teams, on the basis of a longitudinal survey of LGE's R&D department when he was a professor of a Techno-MBA course established in the DDD of the company.

<sup>57</sup> Interview with a manager of DND Super A team, DDD (L-15, 22/08/00).

the members had a chance to talk with some of his peers working in another project team during lunch in the refectory. He told to them about the problem they faced. This is not unusual, because workers have a chance to meet their peers and friends at lunch break.<sup>58</sup> By listening carefully to what was said, one of his friends realised that in a past project, he had faced a similar problem and came to master it through many experiments and trial and error. He joined the team at once and thanks to his help and knowledge sharing, the team solved a problem that was critical in the project. In the end, the project led to radical innovation. This is the benefit of the organisational embeddedness of knowledge embodied in individuals and communities of practice (Lam, 2000). A collective form of knowledge and its organisational process of embeddedness may emerge from the combination of sets of dispersed individual knowledge based on context-specific, relational/organisational proximity. The case described above is not just an unusual anecdote. A variety of cases similar to this have taken place in the everyday work life at LGE.

In recent years, the company has recognised a need to activate communities of practice as a means of making organisational culture learning-oriented and innovative. This is in part because the company has observed successful cases like the one described above. But especially, management consulting institutions such as consultancy firms and the LG Economic Research Institute have also suggested the importance and role of communities of practice and social learning in competitiveness. In its survey report on organisational culture and learning, the management innovation team reports that there is the necessity to take strategic action to promote communities of practice in order to change organisational culture in an incremental way, as well as to make organisation learning-oriented. What they point out is absolutely right and timely. But, it is a problem that the company forces workers to organise communities of practice via a top-down process rather than trying to create institutional bases critical to making those communities activate. Even though there have so far been a lot of strategic actions

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<sup>58</sup> All workers have lunch at the company refectory between 12:00 and 13:00. After lunch, some of them may enjoy a club activity such as martial arts, oriental chess or learning English. Others may take a rest, talk with peers, smoke or listen to music.

similar to a strategy for facilitating communities of practice, these have not been as successful or satisfactory as they expected. This is not surprising, since most of these attempts have tended to focus on harvesting visible performances in the short-term rather than seeking them in the long-term. On the basis of a survey carried out by the innovation management team, the company, therefore, plans to create institutional foundations such as regular consensus meetings, interactive conferences, the promotion of boundary-spanning activities and the creation of communication space.

### ***5.9.2. The task-force activities and learning***

The company has attempted to make use of task-force organisations in order to not only sustain radical learning but also solve specific problems.<sup>59</sup> The company operates task force teams to solve certain problems or perform emergent tasks in a given point of time (see Table 5.7). A task-force team is divided into three types according to the complexity and nature of the problem-solving process for a task-force activity. Task-force projects for seeking radical (or strategic) learning are likely to be raised by corporate decision-making groups.

In general, the period of a task-force activity varies from a few weeks to over six months. Each task force team is composed of members who have expertise and knowledge in a given project. These members are mobilised through various kinds of formal team units. It is believed that this sort of task-force team, which is cross-functional and boundary-spanning, is a form of organisation capable of effectively mobilising distributed knowledge across different areas of expertise in the face of an emerging problem or task.

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<sup>59</sup> This section is based on interviews with managers of the R&D team and the organisational innovation team (L-10, 03/09/00 and L-15, 22/08/00).

Table 5.7 Types of the task force team

<b>Class</b>	<b>Type of problem-solving</b>	<b>Level of question</b>	<b>Term &amp; organisation</b>	<b>Organisational units involved</b>
<i>A-class</i>	Solving the gulf between an ideal state and a real state	Top down	- Over 6 months - Led by staff beyond team leader level	- Consulting team - Organisational innovation team
<i>B-class</i>	Making the current state better	Top down plus bottom up	- 3 to 6 months - Led by staff equal to team leader level	- Process innovation team - Team-level task
<i>C-class</i>	Solving the existing problems	Bottom up	- Less than 3 months - Led by staff under team leader level	- Sub-team level task

Source: the Digital Display Division.

The performance of a task-force team seems to depend on two regulatory frames. To avoid uncooperative actions, among other things, the company institutionalises a strict rule that managers in charge of formal organisational units, such as teams and departments, have a duty to select the most appropriate and competent members when a task-force team is newly organised. This may be an important pre-condition for the company sustaining an effective outcome of task force activities. There is a possibility that some managers will be reluctant to select members of their teams and send them to a task-force team. Secondly, there is a specified rule that a task-force team, unlike a formal organisational unit, may have a relatively horizontal form of organisation such as a democratic procedure of decision-making or a liberal working environment. Usually, these teams are led by someone considered to have the best knowledge of what to do, irrespective of their occupational status in a formal organisational unit. This also seems important for firms whose managerial practices are to a large extent hierarchical and top-down, like LGE.

Let us look at the process of how task force teams operate. Before commencing a specific task force activity, all members of the team may stay together in a certain place,

such as a resort facility or the corporate training centre, for about a week or so. The aim is to get to know one another as well as to understand what they have to do and how in the course of the task-force activity. This is a team building process that may be required to achieve a successful outcome. What is important is that this process may contribute to helping members with diverse backgrounds and interests share relational and cognitive proximities. In more detail, a team building process enables members to construct relational and cognitive proximities, requiring linguistic and semantic equivalence, shared tacit knowledge, rapid processing of information, trust, or other conventions of communication (Nooteboom, 1999b; Amin, 2000). Distinctiveness of cognitive frames and a variety of expertise among individual members may help a task-force team to increase the potential for sustaining new learning. Meanwhile, team building helps them to increase relational proximity that is conceived as an important way to do a project together rapidly, as well as to learn about one another in an interactive manner. While both dimensions of proximity seem to be opposite sides of a coin, they do not necessarily erode each other's advantages. Rather, they are complementary and, therefore, can make synergistic power by blending novelty based on cognitive distance and communicability based on relational proximity (Nooteboom, 1999a). In this sense, a team building process is targeted to regulate and combine both proximities and can be influential for the whole process of a project and its outcome.

The company provides a task-force team with a small project room within an existing working space and they usually work together in the space until the task is completed. Often, members of the team may even sleep in the working room. In the process of a problem-solving activity, members exchange distinctive tacit knowledge that they possess and, by combining tacit knowledge and codified knowledge, try to make a set of knowledge embodied in individual members effective and available. The nature of this kind of *ad hoc* project team may be organised so as to draw on valuable tacit knowledge embodied in individual members. Members of a task-force team may be those who are considered to have knowledge of specific organisational context and routines as well as valuable tacit knowledge related to the given project. In this sense,



the process of a task-force project should be given to combining them. After completing the task, the team gives a presentation to test the practicality and feasibility of the outcome as well as to diffuse new knowledge. One step further, every year the company holds a company-wide conference called the 'Skill Olympics', which is designed to represent the best practices from performances produced as a result of task force activities. Participants include domestic and overseas subsidiaries and first-tier suppliers whose relationships with the company are on a long-term basis. The purpose of the conference is to promote the best practice and a learning environment among workers at a corporate-wide level.

The company has increasingly attempted to take advantage of task force teams in the pursuit of both discontinuous learning and incremental learning. As shown in Table 5.7, short-term projects which are normally taken less than 3 months are organised to not only make the current state better but also solve the existing problems, while long-term projects which are required more than 6 months aim at sustaining radical innovations. The company has come to conceive the task force team as a form of organisation relevant for coping with shortened product cycles, intensified market competition and environmental turbulence. On the other hand, organising a task-force team may combine the advantages of a large organisation, with an ability to effectively mobilise geographically and organisationally distributed resources, and the advantages of an informal or small organisation, which has flexibility and rapidity.

Annually, a number of task-force teams are organised for new product development and problem-solving. Their number has been increasing for the last few years. For instance, in 1999 the DDD operated more than 100 task-force teams, double the number of four years before. This may reflect the ways in which the company has made a great effort to sustain innovation in organisation and product and to change organisational routines in better ways by organising task force teams. It should be noted that the company has tended to try to activate this kind of organisational form to cover a lack of informal learning among organisational members.

In sum, evidence shows that the task force teams as learning communities play an important role in sustaining incremental and radical learning and that the process of learning involved in task force activities can be sustained by bring together tacit knowledge and codified knowledge. It should be noted that the performance of task force activities would be dependent on the extent of relational/organisational proximity between project members, but it is not to say that this relational proximity could only be sustained through geographical proximity. What I want to argue is that geographical proximity alone cannot secure the efficiency of task force activities and the potential of learning. Instead, geographical proximity, in managing task force teams, can be used as a useful means to more facilitate relational/organisational proximity.

### ***5.10. Conclusions***

This chapter has presented the various dimensions of restructuring and learning sought by LGE to adapt since the economic crisis. The restructuring and learning experience of LGE have offered some critical implications for understanding learning and adaptation.

First, corporate adaptation in radical change may be possible through a combination of restructuring and learning. A radical external shock has not only allowed the company to recognise a sense of crisis in organisation, but also to undertake routine-breaking corporate restructuring away from organisational lock-in. Corporate restructuring has been focused mainly on the reform of business structure moving towards core competences through downsizing and the reorganisation of production; redundancies and the pursuit of flexibility in labour and production; and the reform of organisational structure. Some of these restructuring tools are apparently intended to save costs. It should be noted, however, that these restructuring practices have also made it possible for the company to further learning-based adaptation. They have contributed to

unlearning old practices and routines and opening up a chance to sustain new learning such as innovations in products and processes.

Second, corporate learning is not reducible to a matter of localised learning and geographical proximity. Based on this, the company, despite the crisis, has made great efforts to promote technological learning through the intensification and globalisation of R&D activities and cooperative strategic alliances as the company has considered as a crucial precondition for continuous adaptation and long-term success. Such learning practices do not tell us about a matter of whether the source of learning is localised or trans-localised, but indicate that corporate learning takes place across boundaries of organisational space beyond limited space/place.

Third, the effectiveness of learning seems influenced by different proximity effects. Collective learning is dependent on the degree of relational/organisational proximity between actors. However, it also needs to note that geographical proximity contributes to the formation and development of relational/organisational proximity. LGE experience shows that the geographical decentralisation of organisational units challenges the circulation and mobilisation of knowledge and competence within the organisation in many ways. It is clear that, to a degree, spatial proximity influences organisational learning, although it is not a sufficient condition. Rather, spatial proximity can be a necessary condition for creating and sustaining relational/organisational proximity. For the purpose of the promotion of technological and organisational capabilities, the company maintains a functional linkage between R&D and manufacturing, whilst attempts to mobilise the focus of technological competences within the capital region offer a greater potential for using localised sources of knowledge and competence.

Fourth, the company has increasingly tried to use a temporary form of organisation, called the task-force team, to sustain learning, not least radical learning. The task-force team combines the advantages of a large organisation, with the ability to

effectively mobilise geographically and organisationally distributed resources, and the advantages of an informal, or small, organisation which has flexibility and rapidity. In addition, LGE is trying to activate epistemic communities to cover a lack of informal learning and instil learning-oriented organisational culture. In addition, the operation of task-force teams has been increasing to improve problem-solving capabilities and sustain radical innovations. These can be important parts of intra-firm modes of learning that enable to mobilise various sets of knowledge in and out of the firm and embed new knowledge and routines in the organisation. In the following chapter, we will discuss the Samsung case with the same theme as LG.

## Chapter 6

# Learning and adaptation in the Samsung Electronics

### *6.1. Introduction*

This chapter explores dynamic ways of corporate restructuring and learning in the face of a radical environmental change within SEC. It is widely recognised that SEC is the flagship company of the Samsung group, one of the largest Korean chaebol. SEC has been celebrated as a case that has achieved path-breaking adaptation in response to a series of difficulties such as the economic crisis and organisational lock-in. This chapter starts by summarising a series of attempts to destroy path-dependence and sustain organisational innovation and illustrating the general process of restructuring in the face of the crisis. In this section, it illustrates that traditional restructuring tools have been critical for SEC to sustain learning-based adaptation. This claim is explored in more detail in the following sections which tackle SEC's restructuring processes on the basis of downsizing, employment adjustment, change in business structure and change in organisational structure.

In the second half of the chapter, I explore learning-based adaptation tools such as R&D activities and inter-firm alliances. SEC has focused more on technological learning since the crisis and tried to make better use of internal and external sources of knowledge and competences. Especially, this chapter deals with spaces of learning and the issue of proximity with the reference to spatial reorganising processes of production and R&D units. Compared to LGE, while SEC has a multi-divisional and decentred structure of organisation, its geographical configuration is extremely concentrated. SEC's recent changes in production and R&D units show spatial strategies that represent the clustering of specific organisational functions and the use of the advantages of space and place. These strategic actions provide us with important implications for learning and adaptation.

Unfortunately, this chapter cannot illustrate the complexities of tacit ways of learning. This is due to the great difficulty of gaining access to the company for a longitudinal survey as I argued in Chapter 4. To partly cover this methodological limitation, a variety of secondary source data and the results of interviews with industry specialists and workers are used.

## ***6.2. Breaking path-dependence and innovating organisation***

Companies that have an experience of great success in the past and have sustained growth in more or less stable situations over a long time might have trouble changing... Usually the demise is the result of the top management's inability to read changes in the environment and to respond adequately... (CEO of SEC).

It seems that what the CEO of SEC is talking about is the nature of organisational change and how it corresponds with what the company has been doing so far. It is interesting that his tone shares some key ideas from an evolutionary perspective, such as path-dependence and lock-in, in stressing how difficult large companies find it to move beyond path-dependence or organisational lock-in. At the same time, it emphasises the crucial role played by the top decision-maker in sustaining a firm's continuous survival and evolution. Tushman and O'Reilly (1996) argued that managers who try to adapt to discontinuities through incremental adaptation are unlikely to succeed. In this regard, it is useful to recall as Schoenberger (1997) notes:

firms change all the time. They buy new equipment, hire new people and move the old ones around, enter new markets, reorganize departments and functions, change supplies, develop new products, and so on, and they are constantly engaged in these activities. So *the question is not so much why firms don't change, as why they embrace particular kinds of change while resisting others...* The firm's strategy entailed change on a large scale, but the wrong kind of change (pp. 113-4; my emphasis).

For the last few years, SEC has been celebrated as an exemplary case that has sustained path-breaking adaptation (see *Fortune*, 24 January 2000; *Financial Times*, 27 March 2000; *Business Week*, 20 December 1999). The company has disposed of radically old routines and practices predominant in most of large Korean firms. Before entering a discussion on the various dimensions of corporate adaptation and learning, this section tries to explain the recent efforts of the company to sustain radical adaptation and organisational innovation, by drawing upon various secondary sources and interviews with middle managers and industry specialists.

Samsung started its business in consumer electronics about 30 years ago. However, the company emerged as an international player in the electronics industry by virtue of the surprising success of DRAM (Dynamic Random Access Memory) chips since the early 1990s (see Table 6.1). SEC's DRAMs business has been ranking top in the world market share since 1992. In 1995, memory chips accounted for 90% of corporate profits and half of all sales, due to a surge of memory chip demands. However, this success induced complacency in top managers and workers. More seriously, such a long run of success in the semiconductor business has tended to give rise to the predominance of semiconductor executives in senior management, who represented the 'glamour' side of the business when global demand for memory chips was strong (*Financial Times*, 27 March 2000).

Table 6.1 Market share in memory chips (1998)

	<i>1<sup>st</sup></i>	<i>2<sup>nd</sup></i>	<i>3<sup>rd</sup></i>	<i>4<sup>th</sup></i>
<b>DRAM</b>	Samsung (Korea)	Micron (US)	Hyundai (Korea)	NEC (Japan)
	2,854 <sup>a</sup> (18.6%) <sup>b</sup>	1,791 (11.7%)	1,752 (11.4%)	1,694 (11.0%)
<b>SRAM</b>	Samsung (Korea)	NEC (Japan)	IBM (US)	Toshiba (Japan)
	749 (20.5%)	368 (10.1%)	365 (10.0%)	294 (8.1%)
<b>NVM<sup>c</sup></b>	Intel (US)	AMD (US)	Atmel (US)	Fujitsu (Japan)
	760 (15.1%)	561 (11.1%)	551 (10.9%)	487 (9.7%)
<b>Total</b>	Samsung (Korea)	NEC (Japan)	Micron (US)	Hyundai (Korea)
	3,790 (15.4%)	2,243 (9.1%)	1,857 (7.5%)	1,792 (7.3%)

Source: Dataquest (May 1999).

<sup>a</sup> US \$ million.

<sup>b</sup> Market share

<sup>c</sup> NVM: Non-Volatile Memory

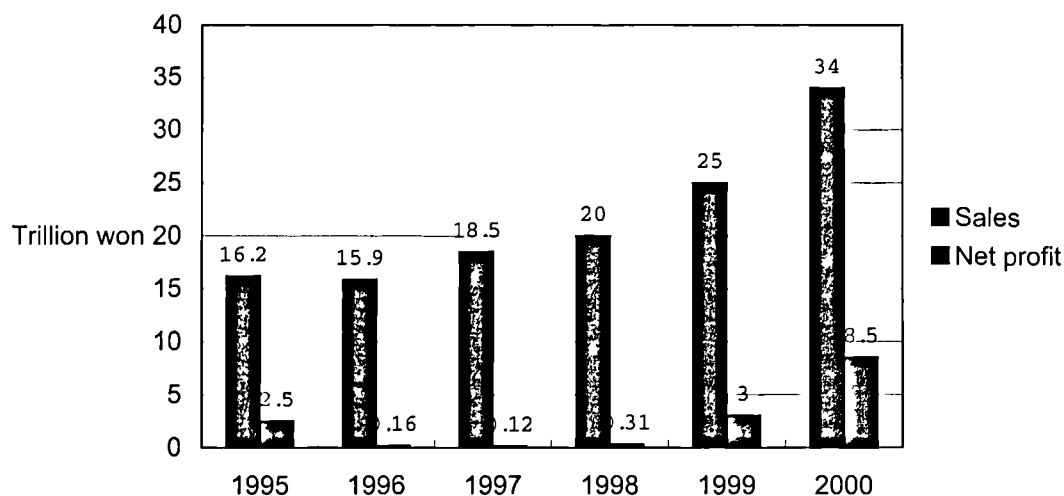
As a result, the company's fate had become too dependent upon the risky memory chip business which has volatile cyclical fluctuations in demand. Nevertheless, the corporate executives did not pay much attention to other business lines, particularly consumer electronics which had been suffering profit losses. As a manager of the management team indicates:

Executives did not give priority to business areas other than semiconductors until they experienced the 1996 crisis brought about by a great downturn of demand on DRAMs. Not only did they have less regard for non-semiconductor business areas, but also they expected that such a crisis could be simply overcome if demand on DRAM resurged soon (S-2, 07/10/00).

At the end of 1996, when the company situation was getting worse, the chairman of the Samsung group replaced the leader of the company in an attempt to fundamentally transform the company in order to survive. The chairman appointed Jong-Yong Yun as the CEO of the company, who had spent most of his career in consumer electronics and was in charge of SEC's Japanese subsidiaries for some years before being named CEO. It is known that the group's chairman had two main objectives in appointing Yun.



Figure 6.1 Changes in sales and net profit (1995~2000)



Source: Samsung Electronics Company

First, Yun was expected to be able to redress the imbalance in business lines by instigating path-breaking new perspectives, because he was a non-semiconductor executive who had a long career in consumer electronics. Second, he was expected to possess a wide-range of knowledge on the restructuring processes of Japanese companies through years of direct observations in Japan. Yun explains the corporate situation at that time:

After taking over as CEO at the end of 1996, I stressed that our company must face a real crisis if I did not fundamentally undertake restructuring right away. Nonetheless, no one had had a sense of crisis, because they had been too familiar with the cycle of demand fluctuation on DRAM. They persisted in a received wisdom that such a crisis tends to occur periodically every 3 to 4 years and in turn a resurgence of demand would undoubtedly follow. However, I was very worried about that because I had observed directly that not a few Japanese semiconductor companies had gone down, owing to that kind of thinking (*Nikkei Business*, 6 November 2000).

This reflects an evolutionary perspective, seeing that firms are likely to fail to change in the face of radical change. Inertial pressures, particularly cultural inertia known to come from an experience of success in the past (Tushman and O'Reilly, 1996) reinforce

the firm's routines and practices (Sharfman and Dean, 1997). From 1996 SEC prospects turned gloomy after the glorious triumphs of 1995, as profits plummeted due to both the great collapse of prices for memory chips and continued losses in consumer electronics (see Fig. 6.1). To cope with the crisis, the CEO set out a revolutionary project to transform the declining company. This project has implications for understanding routine-breaking adaptation, illustrating a four-stage restructuring strategy for radical change (*Fortune*, 24 January 2000):

Stage I. Using chaos to shake up the old structure and practices

Stage II. Deprecating past accomplishments

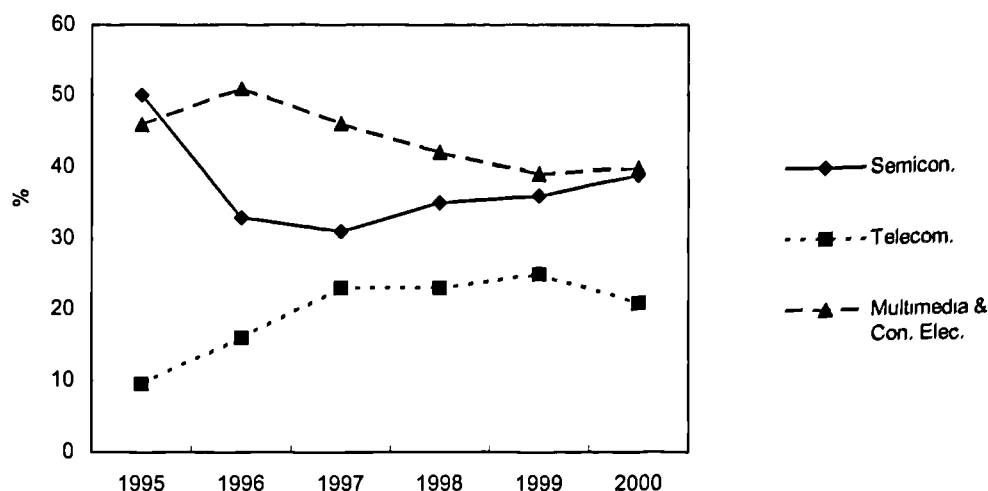
Stage III. Instilling new values

Stage IV. Stabilising the company

Like LGE, the company, first of all, had to drastically reduce its debts, sell or spin off peripheral business sectors or those unrelated to its core businesses, cut subsidies to other affiliates, and cut a third of its workforce. The strategic focus moved to innovative high-end products and resolutely abandoning market-saturated, low-profit peripheral businesses. SEC continued to invest over 8% of sales in research and development, even during the financial crisis. It concentrated most R&D investment on emerging new businesses, or on its core strengths, such as semiconductors covering memory and non-memory chips, mobile communications, Digital TVs and TFT-LCDs.

Second, it has been trying to redress the imbalance between business lines with the intention of reducing excessive dependence on semiconductors. The company operates three business divisions – semiconductors; telecommunications; multimedia & consumer electronics – and aims to reach for a third of sales in each (see Figure 6.2).

Figure 6.2 Changes in the proportion of sales by business sector



Source: Samsung Electronics Company

Third, the CEO requested senior managers to relinquish obsession with expanding the market share at the expense of profits. Such practices had remained prevalent as a rule of competition in the Korean business tradition. To eliminate this, the CEO took a radical action. As the value of Korean currency to US dollar fell by double after the financial crisis, the company had a unique chance to export consumer electronic goods such as TVs and home appliances with a better profit margin. However, the CEO decided to shut down the plants for two months because so many unsold TVs and other appliances had piled up in its warehouses. The cost of carrying that inventory was devastating to the company's balance sheets.

The CEO announced that Samsung factories would not produce goods, if orders were not in hand with profitability assured. "Shutting the TV plant sent a very strong signal to the staff", said a director of supply chain management (*Business Week*, 20 December 1999). The CEO also put it:

The Asian financial crisis was very helpful for our managers to change their attitude and the way of doing things. In more detail, the crisis made it easier for the company to overcome initial resistance from managers who were used to putting size

over profits (*Fortune*, 3 February 2000).

In general, strategic organisational change is likely to be impeded by organisational resistance and management non-commitment (Eriksen and Amit, 1996). It is recognised however that such a radical shock, to a degree, enables the company to drop ill-established management practices. In addition, the destruction of the lifetime employment convention was a critical discontinuity from the past.<sup>60</sup> Historically, the Samsung group had strictly forbidden workers to organise labour unions. In turn, the company tried to avoid potential conflict with employees by paying its people better than other chaebol companies, as well as by giving them more favourable incentives such as building a better workplace environment, providing employees with more opportunities to continue individual learning, offering welfare benefits, and providing job security. Based on the implicit convention of employment security, the company had tried to avoid mass job cuts. However, during the crisis, the company faced the necessity to use redundancies as a critical means of restructuring. Its employment policy moved from employment stability towards internal labour market flexibility. Top executives made a decision to abandon the lifetime employment convention. These followed a chain of mass job cuts in the company (see Figure 6.3). This was also a radical concept in big Korean firms in general, and Samsung in particular.

Based on these ‘unlearning’ processes, the CEO commenced to instil new values and path-breaking ideas into the company. ‘Grafting’ is a significant way that a company can use in order not only to learn external sources of knowledge but also to unlearn obsolete routines. The concept of ‘grafting’ can be defined as a radical attempt to imbue new values, new knowledge, and routine-breaking perspectives via recruiting new people and replacing core personnel in a rational and relevant way. As Huber (1996: 136) argues, organisations frequently increase their store of knowledge by acquiring and grafting on new members who possess knowledge not previously available within the organisation. Thus, grafting may become a more frequently used

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<sup>60</sup> Interviews with a manager of the management team, Consumer Electronics Division (S-1, 30 09 00) and a manager of the manufacturing team, Telecommunication equipment plant (S-3, 22/09/00).

approach for organisations to quickly acquire knowledge that is new to them.

SEC has shown examples of adaptation and learning through grafting. In particular, the replacement of the CEO in the face of a crisis is of critical importance, because he has played a central role in turning around a large bureaucratic company. In 1999, the company changed its human resource management policy, replacing 'pure bloodism' with 'mixed bloodism'. 'Pure bloodism', embedded over years as a corporate tradition and practice, meant that corporate managers should be people who began their job in the company, and not managers and leaders recruited from outside the company. The company has recognised that such an isolationist practice can no longer be effective as it tends to retard transformative thinking, creative ideas and dynamic organisational learning, which may be regarded as an advantage of (cognitive) diversity. To resolve this problem, the company strives to hire external experts and specialists in their own fields. For example, the company hired the CEO of a US-based advertising company as the new head of the Global Marketing Business Division. The company has recruited highly qualified employees who mostly hold advanced degrees from US universities. In 2000, the company hired 342 people with advanced degrees – mostly ethnic Koreans studying in the US, to instil new values and new ways of thinking as well as to encourage organisational learning and innovation competences. This way of governing the firm has actively spread into other big companies, particularly its rival LG. Searching for qualified human resources has become a critical task of overseas subsidiaries, particularly of US R&D centres.

Bringing together insiders and outsiders is not all that represents the company's efforts at organisational innovation and the improvement of organisational capabilities. The power of human resources that the company retains is considered to be formidable amongst Korea's largest firms. It is well known that the company has made great efforts to promote technological competences and organisational skills. Despite the financial crisis, the company has tried to improve organisational competences and knowledge as well as to mobilise more effectively organisational knowledge by

reorganising employee training programmes. Since the early 1990s, employee-training programmes have been run in corporate training centres such as the Advanced Technology Training Centre (ATTC), the Global Marketing Research Centre (GMC) and the Centre for Leadership Development (LDC), all of which were established around the capital region. ATTC focuses on training engineers in the areas of service, technology systems and software. In the past, the methods of training employees were unilateral, firm-centred and technique-teaching oriented. As these methods became no longer relevant, in 1998 the training centre was substantially reorganised (*Korea Economic News*, 14 November 1999). Since then, employees receive problem-solving oriented, on-the-job-training courses, while compulsory, regular training courses that took place in the central training centre have become significantly reduced. In doing so, ATTC tries to design trainee-centred, tailored training programmes in collaboration with the sub-division's education & training teams. In contrast, LDC and GMC are non-technology employee training centres designed to promote managerial personnel and marketing specialists. In particular, GMC, which was established in the early 1990s in order to keep pace with a rapidly increasing globalisation of the corporate activities, has played a crucial role in promoting local marketing specialists. GMC has recently focused more on teaching foreign languages and offering knowledge on marketing strategies and national-specific cultures critical for overseas marketing.

However, it is significant that the company established a semiconductor university within the Kiheung semiconductor complex in early 2001. The company employs more than 900 engineers and scientists with a doctoral degree. Of them, more than 500 Ph.D. engineers are specialised in semiconductor engineering. As one engineer said:

In Korea, it is clear that Samsung is the strongest link as far as semiconductors are concerned. However, it is disappointing that the universities' technological capabilities and educational programmes on semiconductors are not so satisfactory (S-5, 20/09/00).

As a technological leader, the company wanted to utilise internal resources and capabilities to increase technological competences. In pursuit, the company appointed 70 Ph.D. engineers as academic staff at the university and selected 61 young engineers as the first students.<sup>61</sup> In addition, every year the company selects some engineers and sends them to academic institutions, mostly US-based universities, in order to give them an opportunity to gain their Masters or Ph.D. degrees.<sup>62</sup> By offering this incentive, the company aims not only to give workers a chance to upgrade their individual knowledge and competences, but also to instil new ideas and new ways of thinking in the whole organisation.

In short, the company has taken various measures to unlearn obsolete practices and routines which are regarded as factors hindering organisational renewal. They have also made great efforts to innovate organisation. Nevertheless, it should be stressed that the recent radical shocks, such as the crash in memory-chip prices and the financial crisis, have played a role as an external driving force to make such changes possible. Such a chain of organisational crises enabled both executives and workers not only to think seriously about what went wrong but also to have a sense of crisis, with recognition of the inevitability of drastic reform. In addition, many observers agree that such radical changes could be realised because the CEO put radical measures into practice. The remaining sections detail the processes of adaptation and learning sought by the company in the latest face of radical change.

### ***6.3. Downsizing***

In the mid-1990s, as the company faced the continued downturn of semiconductor profits and the deepened profit loss of the home appliance sector, the need for

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<sup>61</sup> The intra-firm university is formally authorised as a higher educational institution by the Ministry of Education and plans to offer all kinds of degrees from first degrees to PhD degrees.

<sup>62</sup> The company selected more than 70 staff in 1999 and plans to increase the number to 150 in 2001.

restructuring was raised inside the company. However, strategic actions for restructuring were not activated. Since the financial crisis, the government has initiated, as we saw, a corporate restructuring programme guided by the IMF. Government intervention became central to the radical moves by chaebol towards improving management practices and governance structure.

The company took drastic action to cope with the uncertain crisis. As described in the case of LG, the most critical issue for big firms was to lower their debt-equity ratio to less than 200%. Downsizing in less competitive or marginal business sectors became a key response (see Table 6.2). Firstly, the company sold off loss-making subsidiaries and production facilities. The company sold off AST, a loss-making American subsidiary that manufactures and sells personal computers for the American market. In 1995 the company had acquired the American PC maker, once one of the top American PC manufacturers, with a view to penetrating the US personal computer market. But, the subsidiary continued to lose profitability for various reasons.

The company also sold off another US subsidiary, SMS, which produced chemical materials used for manufacturing semiconductors, regarded as a non-core business. In turn, the company agreed to sell off a domestic semiconductor plant to Fairchild, a US semiconductor firm in December 1998. As Fairchild agreed to take over all physical assets, including the factory, manufacturing facilities, business organisations and 1,500 employees, SEC could take advantage of the opportunity to adjust non-core business as well as to make mass job cuts.



Table 6.2 Major business downsizing cases (1998-2000)

Forms of downsizing	Sectors
<i>Sell-off</i>	SMS (a US subsidiary firm) (1998) AST (a US subsidiary firm) (1998) Production base for semiconductors used in electrical power products (1998)
<i>Spin-off (EBO)</i>	Distribution (1998) General affairs (1998) Sales unit for computer network systems (1999)
<i>Spin-off (Subsidiary)</i>	Light household appliances (1998) After-sales service (1998) Refrigerator manufacturing sector (1999) Word processor software business unit (2000)

*Sources:* based on *Korea Electronics Times*; *Korea Daily Business*  
(1 January 1998 ~ 30 April 2001).

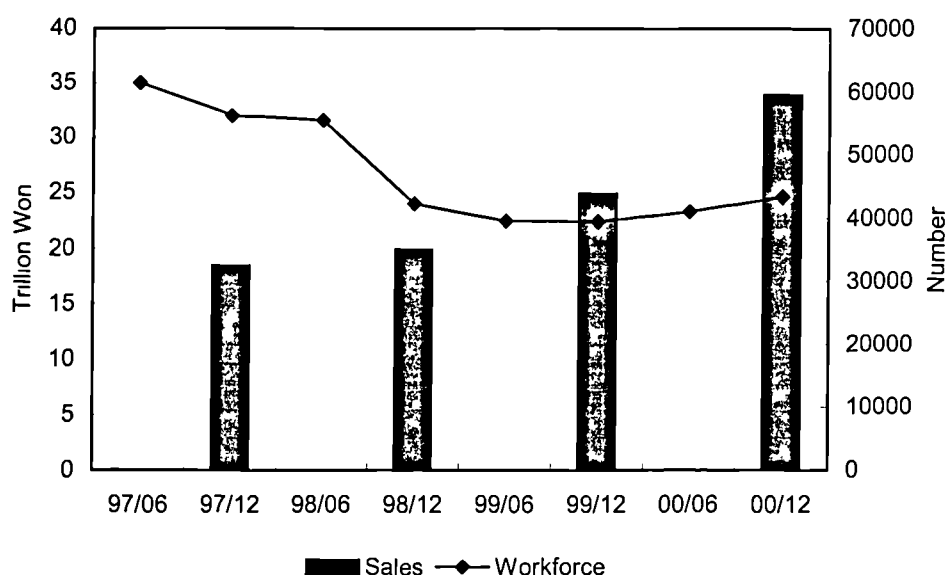
A spin-off strategy also enabled the firm to adjust its business structure and achieve redundancies. As mentioned in Chapter 5, big Korean firms have made good use of this strategy as a means of restructuring since the crisis. SEC has promoted spin-offs of marginal and peripheral business sectors with the use of various incentives (*Korea Electronics Times*, 28 December 1998). Thus, non-production units such as distribution, general affairs and after-sales service have been spun off in the form of either independent firms or subsidiaries. Although these companies have become independent companies, they still have a strong connection with SEC, as they supply services or parts to SEC.

In addition, many products considered to be low-profit, peripheral items, such as small appliances, audios, VCRs and refrigerators, were transferred in full to either overseas or domestic production subsidiaries. It is clear that streamlining business organisation is part of a strategy, which seeks the internalisation of core activities and the externalisation of peripheral activities. In this context, the company has tried to cut many household appliance items because of the decrease in profitability due to market saturation and management failure. As a result of these efforts, over 145 non-core

business items have been cut in the last three years (*Korea Electronics Times*, 5 January 2001), reflected in SEC's domestic employment falling drastically from 58,000 in 1997 to 39,000 in 1998.

Some executives and the labour-management council had suggested avoiding turmoil in the workplace by reducing wages and working hours rather than cutting a significant number of employees. But, the CEO refused such a suggestion. He argued that there was a danger of the company collapsing by rescuing 30 % of its workforce and employment adjustment was an essential process for renewing a company. In July 1998, the company announced a radical plan to complete employment adjustment as swiftly as possible. This was to minimise the possibility of conflict and workplace instability. To do so, the company cut 20% of its employment in two months and an additional 10% within six months (see Figure 6.3).

Figure 6.3 Changes in domestic workforce and sales (1996-2000)



Source: Samsung Electronics Company.

It is interesting that most workers over 48 left the company in the process of employment adjustment. Only fifty workers aged over 48 remain, under the executive

level (*Nikkei Business*, 6 November 2000). The company thus tended to make redundant workers who were high-paid, but with obsolete skills. Either workers retired from the company spontaneously or others were forced to retire with some monetary incentive.<sup>63</sup>

Table 6.3 Changes in the number of domestic workforce<sup>a</sup>

	1996	1997	1998	1999	2000
<i>R&amp;D</i>	11,900 (20.1)	12,600 (22.0)	11,500 (26.7)	11,000 (27.9)	12,800 (29.6)
<i>Non-R&amp;D<sup>b</sup></i>	47,200 (79.9)	44,700 (78.0)	31,600 (73.3)	28,400 (72.1)	30,500 (70.4)
<i>Total</i>	59,100	57,300	43,100	39,400	43,300

Source: Samsung Electronics Company.

<sup>a</sup> December 31 of each year.

<sup>b</sup> Non-R&D employees = all workers including production, marketing and business support jobs, except for R&D workers.

In contrast to the mass job cuts faced by factory workers, the percentage of R&D workers has significantly increased to nearly 30% (Table 6.3). There has been an increase of nearly 8% compared to 1997. This clearly reflects the corporate strategy, as the CEO notes:

SEC has continuously invested in all sectors, even during the financial crisis. We have been investing in digital technology for 10 years, with 2000 engineers. When external conditions improved, we were able to seize the opportunity, because the Japanese have been more passive in investments (*Financial Times*, 27 March 2000).

The company's business strategy is to concentrate on core businesses and newly emerging business sectors. While taking advantage of its cash-box businesses, such as semiconductors, TFT-LCDs, Digital TVs and telecommunications, the company will further concentrate on the Internet and ICTs (*Korea Herald*, 21 December 1999).

<sup>63</sup> Interviews with S-1 (30/09/00) and S-3 (22/09/00).

#### ***6.4. Reform of organisational structure***

Since the 1980s, the company has a multi-divisional organisational form, as the size of the firm has grown and a range of business has diversified. Although the original idea of the M-form was to reduce excessive burden on the CEO and the difficulties of effective management in diversified business domains, the firm remained characterised by top-down management by the chairman of the Samsung group and corporate headquarters, and disconnection between organisational functions. This is typical of Korean chaebol. However, this governance structure is considered inadequate by shareholders and business experts. It has been argued that it not only hinders the transparency of management but also makes the effective mobilisation of decentralised competences difficult.

After the crisis, the government and civic groups urged the company to transform the corporate governance system, dominated and controlled by the owner family. At the same time, the rapidly changing competition environment required the company to have a more competitive organisational structure. In this context, the company introduced a new form of organisation, called the Global Product Manager (GPM) system, in 1998. In the GPM system an appropriate division takes all responsibilities for product marketing and operations. The GPM system emphasises the authority and responsibility of each business unit and the functional integration of production and marketing by an individual business unit. This decentralisation of decision-making functions is in line with the 'companies within company' system, which LGE introduced recently.

Thus, the new organisational structure allows the leader of a business division to take charge of most managerial functions. The company recognises that since centralised authority is inconsistent with speed management, devolution is essential for adapting to constant changes in the business environment. To do this, each business division established its own strategic marketing team responsible for strategic planning, product

design and both domestic and foreign marketing.

Part of the company's intention, via transparency, is to abolish a business practice in which profit-making sectors provide subsidies for loss-making sectors. The company wants to improve the managerial performance by introducing the new system of corporate governance. The company believes that this will imbue a sense of crisis in individual business divisions and encourage them to manage on their own way. Individual business divisions have to continue organisational restructuring on their own way, with such methods as downsizing, production shifts and employment adjustment. In addition, individual business divisions can mobilise and allocate resources and competences.

SEC evaluates that the new structure of organisation will raise sales and profits by building independent management practices and maintaining processes of restructuring towards core competences. Observers see that the tendency towards decentralisation of management functions into sub-organisational units is likely to continue further (*Korea Electronics Times*, 10 November 1999). Meanwhile, the corporate headquarters seem to be evolving towards becoming a key control centre. This involves movement of its role towards the establishment of medium and long-term corporate strategies to maximise the whole corporate performance, the reconciliation and coordination of interests and tasks among business divisions and the effective allocation and mobilisation of resources among them. However, there are some preconditions. The first is to establish transparency of corporate governance, which implies the disconnection of ties between corporate management and members of the founder's family. The second is to sustain the effective mobilisation of resources and the coordination of tasks between sub-organisations. Thirdly, it is critical that the corporate headquarters and the corporate leader have an ability to govern different sub-organisations.

### ***6.5. Spatial reorganisation of production***

When Samsung embarked upon its consumer electronics strategy in the late-1960s, a former chairman of the group decided to build a large production complex in Suwon city, near to Seoul. The objective was to save labour and distribution costs by operating a manufacturing factory in the capital region with large purchasing power and easy access to an abundant labour pool.<sup>64</sup> To cope with the possibility of additional production sites in the future, the company purchased a vast area of land. The company continued to grow over time and the range of products that the firm produced expanded. Instead of decentralising manufacturing, the company sought to continue the clustering of production as well as R&D facilities in Suwon and its surrounding areas. That is because the company recognised that the capital region was the most suitable for access to a variety of formal and informal knowledge as well as for employing qualified graduates and engineers.

Nevertheless, not everything is clustered in the capital region. A few products are produced in elsewhere. Telecommunication equipment is produced in Kumi, one of the major industrial clusters in the southeast of Korea, and some home appliances are produced in the Kwangju plant in southwest Korea. In the late 1970s, the company took over a government-funded public firm established in Kumi, which made telecommunication equipment. Thus, the Kumi plant became a production site for telecommunication equipment. The Kwangju plant was established, in the mid-1990s, to make electrical appliances such as vending machines, vacuum cleaners and refrigerators. Products that the factory produces were once made in the Suwon plant. However, products produced in Kwangju factories are said to be low profit, peripheral ones. Currently, the company does not pay much attention to home appliances, as this sector has been losing profitability. The company believes that production lines for consumer electronics products, in a mature stage in the product life cycle, will be

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<sup>64</sup> Based on Kang, J. (1996). This book is the autobiography of the former SEC president (Kang, J., 1996) and includes a detailed description on the locational choice of factories and the firm's technology catching-up.

increasingly shifted to overseas plants in general and plants operating in Southeast Asian countries and China in particular, in order to take advantage of cheap labour costs.

The production shift was initiated by political factors. In the 1996 general elections, the government and the ruling party forced the company to promote its industrial activities in non-metropolitan areas, notably less favoured and less industrialised areas, such as the Cholla province which includes Kwangju city. Another similar case happened in 1999:

The company is planning to move home appliance production lines in Suwon, including air conditioners and microwave ovens, to Pusan as a means to cover the downfall in the local economy resulting from the shutdown of the Samsung car plant in Pusan. The political context is very similar to the one that motivated the relocation [of the consumer electronics plant from Suwon to Kwangju] four years ago... The current move also takes place with the general elections less than one year away (*Korea Herald*, 8 July 1999).

Subsequently, the relocation plan was cancelled for various reasons. As one of the managers indicated:

Local voices in Kwangju and Suwon were very unfavourable. Voices in Kwangju required the rest of the production lines to relocate to Kwangju plants, while the voices of Suwon were very reluctant to move them, as you would expect. Together, there were additional but more critical concerns. First, many suppliers in the capital region close to Suwon were opposed to the relocation plan. Second, employees who work in the business units were strongly resistant to moving their workplace. Third, additional increase in distribution costs resulting from the relocation could be a factor threatening the recovery of its profitability (S-3, 22/09/00).

The company has tried to reconfigure the role of each production space. Strategically, activities in high-tech manufacturing and corporate R&D will be concentrated in Suwon and Kiheung. In fact, all R&D laboratories of SEC are clustered in Suwon (the consumer electronics division and the telecommunications division) and Kiheung (the semiconductors division and the Samsung Advanced Technology Centre, a group-wide

electronics research centre). Meanwhile, there is no R&D function in local plants such as Kumi and Kwangju. Literally, the company is rigorously pursuing a hierarchical spatial division of labour. While most core functions, such as R&D, design, marketing and strategic planning, are managed and operated in the Suwon headquarters, local plants perform only a manufacturing function. Most recently, the company has completed a transfer of the printer production line and its managerial function from Kumi to Suwon. As a manager of the Telecommunication Business Division says:

Since the company decided to promote the printer business strategically as one of the core businesses, its production line is also destined to move to Suwon from Kumi. The company understands that this decision can improve efficiencies in terms of sourcing, assets complementarity with related business units in Suwon and, maybe, co-location between manufacturing and R&D. In addition, since some production lines in Suwon plants have been transferred to Kwangju and overseas plants, the company can make use of existing manufacturing space. My team [the strategic planning team] has also recently completed the move to Suwon (S-2, 07/10/00).

Meanwhile, the remaining consumer electronics production lines in Suwon have moved to overseas plants, particularly in China and Southeast Asia. For instance, in 1998, the full line of VCR production was transferred to an Indonesian plant to lower production costs, as the VCR business unit had suffered periodic profit losses (*Korea Electronics Times*, 26 October 1998). An initial plan was to transfer the managerial function together with the production line. However, the company decided that core functions, such as engineering, R&D, planning and marketing, should remain in the Suwon divisional headquarters. There are various reasons for this.<sup>65</sup> Geographical shift of conception functions needs movement of a number of domestic employees, but the majority of employees were reluctant to move to overseas branch and, as a result, there was the possibility of exit of several staff. The loss of critical tacit knowledge embodied in individual experiences and competences appears to hamper effective organisational performance, as it would not be easy to recover managerial expertise once lost. Second, the transfer of established organisational routines and competences

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<sup>65</sup> Based on interview with a manager of the management team, Consumer Electronics Division (S-1, 30/09/00).



may be difficult and time-consuming. Competences and routines constitute a good deal of tacit and collective knowledge embedded in a certain organisational environment for a relatively long time (Sachwald, 1998). This means that the transfer of routines and competences requires a collective learning process via frequent face-to-face interactions and communications between the domestic staff and the overseas subsidiary staff. However, such tacitness and collectiveness seem to make it difficult to copy, or transfer the knowledge to different organisational settings. Considering these problems, the company came to a conclusion. The leader of the VCR business unit comments some important spatial issues:

We came to a conclusion that the physical integration of manufacturing and conception functions is by no means a prerequisite, because most works are computerised and the corporate computer network enables all departments to connect on-line on a global basis. In addition, we do not think that a geographical separation between both organisational units subsequently deteriorates organisational performance, because we believe the members of the staff in charge of conception functions have retained a high level of competence to solve problems rapidly, even at a distance. To cover the gap created by geographical disconnectedness, I, as a leader of a business unit, try to play a bridging role in mitigating the gap between manufacturing units and managerial and R&D units via frequent toing and froing between Korea and Indonesia. It is not easy for me to do that. But, I think this is the best alternative form of organisation when we consider that the overseas production subsidiary has not yet constructed sufficient competences to carry out managerial functions (*Korea Electronics Times*, 26 October 1998).

The leader of the business unit usually works at the Indonesian subsidiary and drops in at Suwon head office more than every two months to check and coordinate the business process. According to him, after relocating the production line to Indonesia, the business has escaped from a deficit in revenue by saving over 30% of production costs by virtue of the lower labour cost effect and various efforts to improve productivity (*ibid.*). Encouraged by this performance, the company plans to continue to shift production lines for analogue consumer electronics products to overseas plants.

As defined by Dosi and his colleagues (Coriat and Dosi, 1998; Dosi and Marengo,

1994), organisational routines are likely to play a key role in both coordinating distributed units of organisations and tasks and solving problems. This implies that routines established in the organisation constitute organisational competences and knowledge that are difficult to transfer to elsewhere. The company views that such competences and knowledge, which have been firmly embedded in the domestic staff organisation, may not be easy to transplant to overseas branches, particularly the Indonesian subsidiary, due to learning difficulties. In this sense, it is regarded that the company has adopted a strategic means to coordinate tasks and solve problems at a distance via established routines rather than taking a potential risk, which may occur by radically transposing managerial functions to the overseas subsidiary.

In sum, recent tendencies in production activities are characterised by a deepened hierarchical spatial division of production and an increase of production overseas. A central idea in the reorganisation of production is based on the agglomeration of high-tech knowledge-intensive industries at the industry level and the geographical integration of core functions at the organisation level. This is focused in the capital region centring upon Suwon and Kiheung. In other words, on the one hand, the company intends to make full use of the regional advantage offered by the capital region in terms of infrastructure and knowledge. On the other hand, the company wants to maximise the availability of competences and knowledge by centralising geographies of core competences in organisation. This context is directly linked to the ways in which the company uses space and place in organising R&D activities.

This example illustrates that SEC strategy on production shift is characterised by a selective relocation strategy. While high value-added electronics products and semiconductors will continue to concentrate on production sites centred around Suwon and Kiheung in the capital region, low value-added consumer electronics products will be increasingly shifted to elsewhere in Korea and overseas. This is rather different from LGE which has attempted to promote all domestic plants as core production sites.

## 6.6. Domestic R&D activities, learning, and proximity

### 6.6.1. The co-location of R&D activities and learning

In spite of facing successive crises, the company has continued investing in R&D so as not to fall behind in international competition. By doing this, the company wants to master digital technology standards, as well as to lead the next generation of semiconductor technologies and markets (see Table 6.4). In the context of a rapidly changing technological paradigm, coping with time competition between firms seems to be critical for continuous adaptation (Best, 1990). The concept of time competition emphasises time-to-market speed and the effective use of market specificity. For the company, like its many competitors, these aspects are important tasks of R&D activities.

Table 6.4 Some indicators of R&D investment

	1996	1997	1998	1999	2000
<i>Investment in R&amp;D</i> <sup>a</sup>	n.a.	1.3 (7.0%) <sup>b</sup>	1.7 (8.3%)	1.6 (6.1%)	1.9 (6.5%)
<i>US Patents</i>	486 (19 <sup>th</sup> ) <sup>c</sup>	585 (16 <sup>th</sup> )	1,306 (6 <sup>th</sup> )	1,544 (4 <sup>th</sup> )	n.a.
<i>R&amp;D/Total</i> <sup>d</sup>	20.1%	22.0%	26.7%	27.9%	29.6%

Source: Samsung Electronics Company.

<sup>a</sup> Unit: billion won

<sup>b</sup> Ratio to sales

<sup>c</sup> World ranking

<sup>d</sup> Ratio of R&D employees to total employees

Over the last few years, the company has attempted to reorganise R&D organisations or establish new R&D organisations in order to cope with increasing technology competition. These tendencies may reflect strategic responses to rapidly changing markets and technologies. This section focuses on the dynamic change of domestic-level R&D organisation in the face of the crisis and its implications for space and learning.

Basically, the company uses a four-layered R&D system (see Table 6.5). SEC has a similar form of R&D organisation to LGE. However, the distinction between both

firms becomes clear in terms of its spatial form. All Samsung's domestic R&D units are clustered in the capital region centred around the city of Suwon (see Figure 6.4). Central R&D centres are operated by the business division and play a central role in developing business-specific technology.

Table 6.5 The role and objective of corporate R&D units

<i>R&amp;D unit</i>	<i>Role and Objective</i>
<i>Group-wide R&amp;D Centre (SAIT)</i>	Basic and applied research Developing technologies in areas beyond the boundary of individual firms – Long-term research projects – Research on future-technology
<i>Business Divisional Central Labs</i>	Focusing on future-oriented products and technologies – Searching prospective businesses or products Developing emerging new technologies Developing new technologically converged products – Developing software technologies – Leading technology standards
<i>Product-specific Labs</i>	– Developing new products and technologies Developing new product models

*Source:* Samsung Electronics Company.

Figure 6.4 Spatial distribution of sub-organisational units in SEC

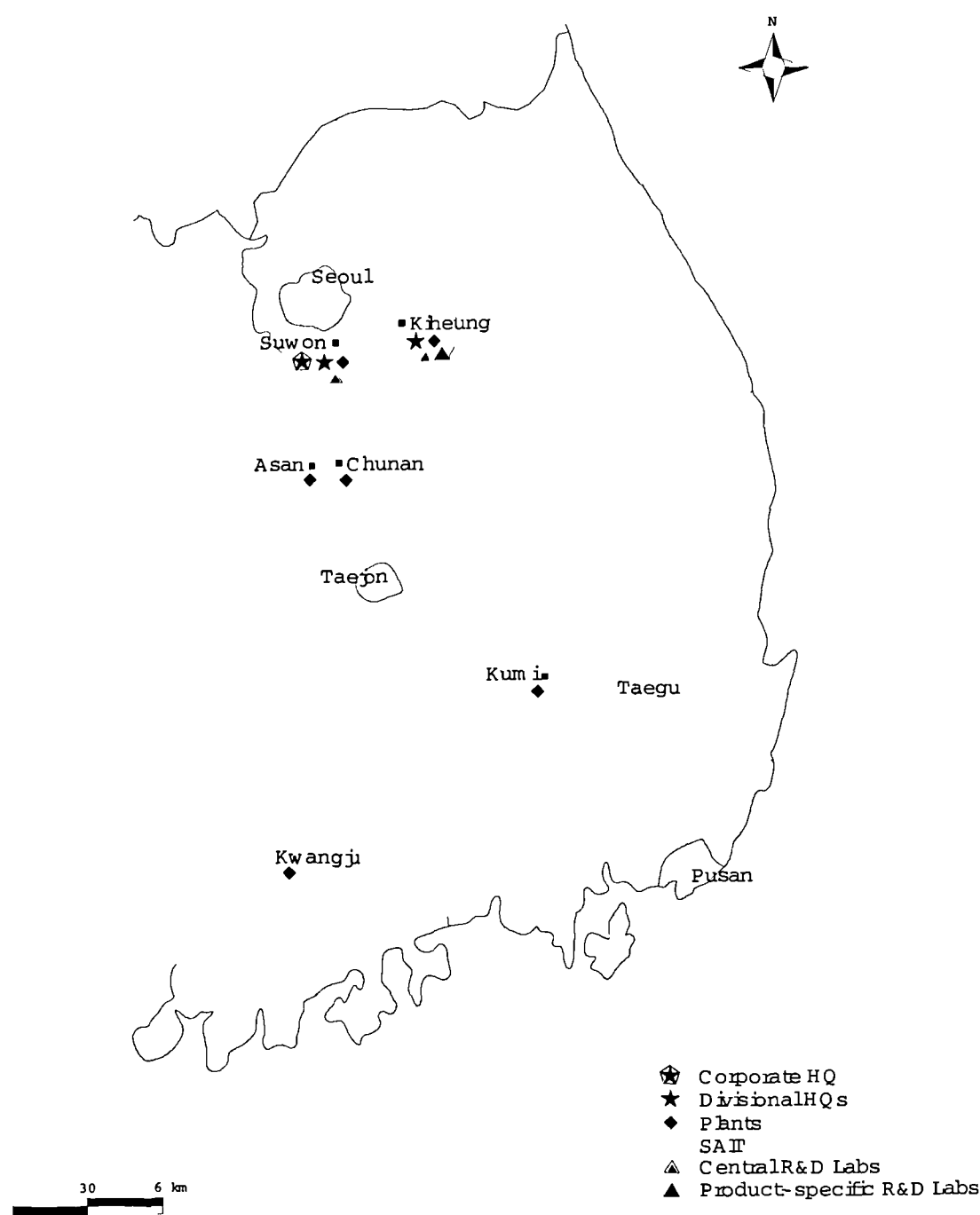
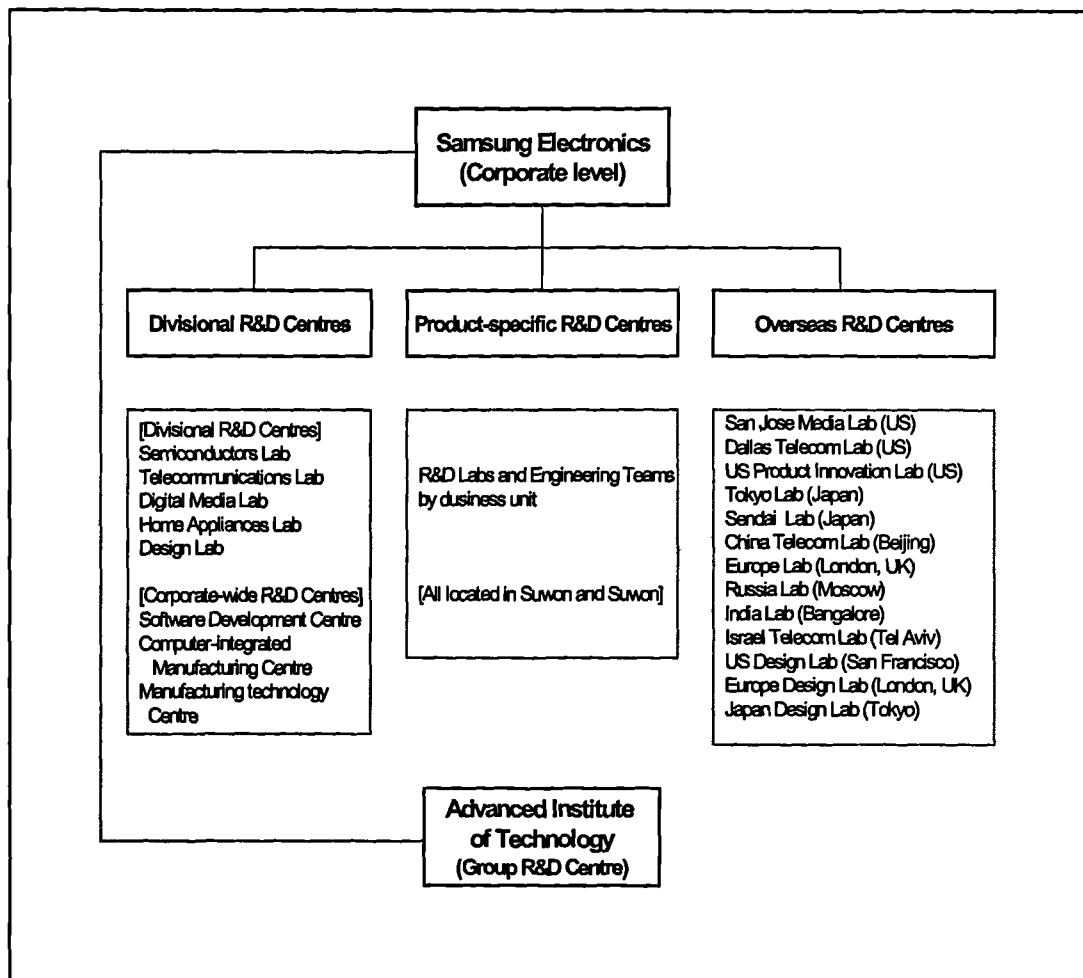


Figure 6.5 Structure of R&D organisations in SEC



Apart from laboratories at the main semiconductor production complex in Kiheung, all other divisional laboratories are located in the Suwon production complex. Subsequently, each sub-business unit has a product-specific laboratory. The product-specific laboratory is in charge of the development of brand-new models and quality improvement related to a specific product. Thus the product-specific laboratory necessitates frequent interaction and communication with manufacturing-related teams. However, not all product-specific laboratories are close to the manufacturing plants. If a factory making a specific product is in the capital region, associated laboratories tend to be close to the production site. But, factories that are in non-capital regions have to link with laboratories in the capital region, mostly within the Suwon production complex. However, there are less numerous.

Interestingly, it is identified that there is a strong tendency of co-presence between R&D units and between R&D and manufacturing units. As revealed by J. Kang (1996) and interviews with SEC managers<sup>66</sup>, the company has regarded that clustering of R&D and production facilities would provide it with some advantages. First, the co-location of R&D laboratories specialising in specific products is likely to improve the potential of interactive learning between people and teams involved in different areas of technology and organisation. The importance of interaction between different R&D teams has become crucial in the context of increasing convergence between varied domains of product and technology. Second, the increasing complexity of labour process, ranging from the development of product and design to manufacturing, may require more frequent interactions and communications among people and teams engaged in different fields of expertise. It is assumed that the greater the proximity between people or teams, the easier the interaction and communication between them and the higher the potential of interactive communication and learning. In particular, the co-presence of central and product-specific laboratories, and of laboratories related to the development and production of a specific product and manufacturing plants, may be more effective

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<sup>66</sup> Interviews with a manager of the management team, Consumer Electronics Division (S-1, 30/09/00), a manager of the management team, Telecommunication Division (07/10/00), a manager of Semiconductor lab (20/09/00) and an engineer of Digital TV lab (08/09/00).

for coping with a shortened product life cycle. Perhaps the higher the complexity of the technology and production process, the more involved are the teams and the more frequent is the interaction and communication between them.

The exceptions are factories that produce telecommunication equipment and some less value-added home appliances, as mentioned above, which are distant from the main production and R&D complex in the capital region. Factories in these business units do not retain R&D function, or even managerial functions like strategic planning and marketing. They have only the manufacturing technology team. However, they also need frequent face-to-face contacts with R&D teams when a brand new product reaches the stage of both testing reliability and manufacturability and in the setting up of the manufacturing line for mass production. In this case, R&D staff members may spend many days in the plant to work with the manufacturing technology and manufacturing teams.<sup>67</sup>

There are some difficulties associated with the spatial separation of conception and manufacturing. According to interview<sup>68</sup>, a concern is less the deterioration of the potential for learning and innovation than difficulties in communication and coordination. However, the company does not consider necessarily the transfer of R&D to manufacturing plants distant from the capital region. From the viewpoint of the company, the benefits that are offered by the operation of R&D units in the capital region and the co-location of different sorts of R&D units are greater than the gains from moving R&D units to distanced manufacturing units.

As far as innovation is concerned, the company considers that the capital region offers the better sources of innovation and learning than elsewhere in Korea. In addition, the geographical clustering of in-house R&D laboratories is assumed to offer more positive effects for technological learning and innovation, not least in a radical way. Tidd *et al.*

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<sup>67</sup> Interview with a manager of the manufacturing team, Telecommunication equipment plant in Kumi (S-3, 22/09/00).

<sup>68</sup> Interview with a manager of the manufacturing team, Telecommunication equipment plant in Kumi (S-4, 23/09/00) and an engineer of the telecom equipment lab (S-8, 21/09/00).



(1997) discuss some advantages of the geographic concentration of strategic R&D for launching major new products and processes. For them, such clustering helps to deal with unforeseen problems more effectively, since proximity may allow quick, adaptive decisions as well as the integration of tacit knowledge through close personal contacts. A senior engineer of TV lab in Suwon supports this view:

Perhaps, the co-presence of multi-tiered R&D laboratories as well as between R&D and core manufacturing units tends not just to increase efficiency in communication and coordination by making formal contact and interaction between people and teams easy. It is also more likely to give workers who belong to different teams an increased chance of informal personal contacts (S-9, 08/09/00).

Managers interviewed argue that such co-location may influence more or less the mobilisation of resources and the creation and sharing of intangible assets.<sup>69</sup> The company is seeking to further intensify the clustering of R&D laboratories. All of the R&D laboratories which are dispersed around the capital region, including Seoul, will be moved to the R&D complex within the Suwon production complex by the end of 2001. In addition, R&D laboratories which have recently been established are all aggregated within each of the main production complexes in Suwon and Kiheung. For instance, the company most recently founded the TFT-LCD R&D centre within the Kiheung semiconductor complex. The aim is to bring together in a specific place people and teams involved in the research and development of TFT-LCD. This is not only to promote efficiency in the process of R&D but also to mobilise decentralised technological capabilities. The company understands that such clustering may not only contribute to mobilising sets of spatially decentralised knowledge among individual R&D teams but also improve the speed of new product development.

Furthermore, it is expected that clustering will promote the ability for R&D teams to interact and communicate in different but complementary areas of technology in terms of technological convergence. In the electronics industry, product development based

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<sup>69</sup> Interviews with a manager of Semiconductor lab (S-5, 20/09/00) and an engineer of Telecom equipment lab (S-8, 14/10/00).

on technological convergence is increasing. For example, the cutting-edge mobile telecom equipment industry may need to bring together varied technologies such as telecommunications, semiconductors and LCD, although in the past it was considered that such technologies had little to do with one another.

However, despite the recognition of the company on co-location, this is not necessarily to assert that geographical proximity and co-presence between organisational units, especially between R&D units and between R&D and manufacturing, induce automatically the increase of 'learning by interacting' and a positive outcome in a direct way. It should be noted that the co-location strategy is part of strategic attempts that the company makes to not only promote organisational knowledge and competences but also to accelerate the efficiency of organisational learning.

#### ***6.6.2. Task-force activities, learning and proximity***

In 1998, the company established a new R&D centre, called the Value Innovation Programme Centre (VIP Centre), to manage *ad hoc* short-term R&D projects. Of course, it was located within the Suwon complex. The VIP Centre provides an exclusive space for the sorts of task force teams performing projects which require boundary-spanning co-working activities on a short-term basis. Those project teams are largely in charge of tasks associated with new product development, remodelling of established products and problem-solving.

Thus, many projects undertaken for developing new products and remodelling existing products are carried out in this centre. In particular, the VIP Centre is seen to be an appropriative space to develop digitally converged products which bring together varied technologies, including consumer electronics, semiconductors and telecommunications (e.g. MP3 and video mobile phones). The reason is that product development projects like these may call for experts beyond the boundary of an individual R&D team. An engineer of the telecommunication lab in Suwon:

An urgent need has emerged to develop products jointly by gathering staff members involved in a project in an independent space. It is very important to cope with time competition in the context of the shortened product life cycle, continuous depreciation in price, and fragmented and rapidly changing customer demand (S-8, 21/09/00).

In this space, members of a task force team carry out all the tasks associated with the project. Until finalising the project, members of the team work in the project room within the centre, instead of being based in workplace in the organisation they formally belong to. Each project team usually has freedom and autonomy in its activity. It invites internal or external experts for discussion to resolve a certain problem if needed. All the members of the project usually work together all the time and spend most of their time in the same place. Quite often, they even sleep in the centre. They can have a drink, exercise and enjoy entertainment. Everything can be done in this centre. Their work routines are similar to those of project teams in LGE. However, an establishment of purpose-specific space is a unique feature of SEC.

For the company, the VIP Centre plays an important role as a specific organisational place where a one-stop service to promote the efficiency of a research project is provided. The company reports that the VIP Centre, since being founded in 1998, has made a critical contribution to innovations in products and processes and the reduction of development time span (*Korea Electronics Times*, 25 July 1999). For example, the company allowed a task force team in charge of the development of an innovative PC monitor to carry out the project. The team was composed of 25 experts, many of whom belonged to different teams and departments. The development of the new product was completed one and a half months earlier than the estimated period of time for the existing way of doing projects. In addition, since the team lowered over 20% of the number of parts used for assembly, a 30% cost saving effect on sourcing parts followed.

What is significant is that the purpose-specific physical space, the VIP Centre, plays a

crucial role in promoting relational/organisational proximity with the support of geographical proximity.<sup>70</sup> A project team is composed of members who have different expertise and belong to different teams, with the advantage of cognitive distance or variety, possibly clashing with relational/organisational distance. However, in the course of working together in an independent space, members of the team tend to show attributes that are common in informal groups, like communities of practice. These are things established in a group through intensive processes of joint practices, open ways of communication and mutual efforts to understand each other. In addition, the VIP Centre is designed as an exclusive place for only the performance of task force activities and is likely to give many chances to share common interests and knowledge between members of various task force teams. In this respect, the operation of a purpose-specific organisational space can be regarded as a critical way to sustain and promote organisational learning and innovation. In particular, in the case of firms that show inflexible and hierarchical corporate culture such as SEC, such a space becomes more an effective means to derive learning and innovation, not least in a radical way.

In sum, it has been identified that the company has been trying to build physical and organisational milieu relevant to cope with radical transformations in markets and technologies. In particular, a strategy using the advantages of proximities can be considered to be one of the significant ways to sustain efficiencies and synergies in R&D activities as well as in organisational processes centred around R&D.

Although both SEC and LGE have attempted to increase technological competences and innovations through R&D activities and attempted to make active use of task-force teams as a means to sustain technological learning and innovation, both are different in terms of the use of space. SEC has focused more on a co-location of R&D units. In addition, the operation of physical space designed to increase efficiency of project activities and the potential of learning between project teams is what SEC is distinguished from LGE.

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<sup>70</sup> Interview with an engineer of Telecom equipment lab (S-8, 21/09/00; 14/10/00).

### 6.7. Globalisation of R&D activities

As explained in the previous section, the company has continued to strive to construct technological competences, not only to keep its leading position in businesses such as memory chips, TFT-LCD and wireless telecommunications, but also to secure its competitive position in businesses such as the emerging digital electronics technology and non-memory chips. Much of this has come from centralised locations within Korea, but it is also involving R&D activities beyond the home base boundary.

Some organisational changes in overseas R&D units have occurred since the financial crisis (see Table 6.6).<sup>71</sup> There is, however, a tendency for these changes to fluctuate according to the economic situation. After the crisis, the company immediately closed down two overseas design laboratories, a US semiconductors laboratory and an Osaka laboratory in Japan, as a means of streamlining overseas subsidiaries. The company integrated the function of the Osaka laboratory into the Tokyo laboratory. Originally, the company had three overseas design centres. Of the design laboratories closed, one was a European design laboratory in London, UK and another was a US design laboratory in San Francisco, USA. Thus, the Japanese design laboratory came to be the sole overseas design laboratory. The Japanese design laboratory had played a key role in monitoring the product design trends of Japanese makers as well as in learning and utilising continuously national-specific competences and know-how related to product design. The company's major export commodities are not just market-specific household appliances, such as washing machines, air conditioners and refrigerators, but also non-market-specific electronic parts such as semiconductors and TFT-LCD. In other words, high-tech products and electronic parts do not require much local adaptation to respond to local demand and tastes, as claimed by Tidd *et al.* (1997), and therefore the company decided to rationalise overseas R&D operations.

Since then, market conditions have been getting better and the company has made a

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<sup>71</sup> This is based on SEC annual reports (1999, 2000) and corporate release materials (1999~2000).

strategic decision to strengthen overseas market share in consumer electronics and telecommunications, such as digital media, mobile handsets and household appliances, in order to diversify the product portfolio for export. In line with this, in December of 2000, the company reopened overseas design centres that were closed down in 1998. The aim was both to monitor changing local-market trends and to develop new product items and design concepts. In more detail, the San Francisco design centre aimed at researching new product concepts as well as developing market-specific product designs, notably associated with mobile hand-sets and home multimedia. London's European design centre sought to monitor European product design trends and perform basic research needed for developing market-specific product designs.

The company has been trying also to diversify R&D area and geographical scale. In particular, overseas R&D laboratories have either been founded or reorganised in order to focus on local adaptation in response to local-specific markets and local-specific sources of knowledge and technology. The company established a software development centre in Bangalore of India, in 1996, with the aim of performing research on the development of software used in telecommunications, home networks and printer systems. The company has a plan to significantly expand its size and function, increasing laboratory staff from 120 to 800 by 2002. The reasons are not complex. It is accepted that India has a great number of highly qualified but relatively cheap engineers and scientists. In addition, it is known that Bangalore is rapidly emerging as an Asian version of Silicon Valley. In operating the Bangalore R&D centre, the company hopes to capitalise on this regional advantage in the form of plenty of human resources and the circulation of local and extra-local knowledge by virtue of Indian social networks. Together, the company plans to utilise the centre as a technological node to penetrate the large Indian market, which is expected to grow explosively in the near future.

Table 6.6 Overseas R&amp;D laboratories (SEC)

<i>Name</i>	<i>Location</i>	<i>Research areas</i>	<i>Estab.</i>
San Jose Media Lab	California, USA	Previously Semiconductor lab (1998 closed) Developing Media technology, notably digital TV (2000 reopened)	1983
Dallas Telecom Lab	Texas, USA	Developing telecommunications technology – Developing North American market-specific products	1997
US Product Innovation Lab	New Jersey, USA	Developing new technology on digital consumer electronics and telecom Analysing on local technological trends	1998
Yokohama Lab	Yokohama, Japan	Originally consumer electronics lab – Developing key parts of digital consumer electronics (1997 reorganised)	1983
Sendai Lab	Sendai, Japan	Developing core technology of optical disk drive	1995
China Lab	Beijing, China	Developing CDMA mobile telecom technology for Chinese market	2000
Europe Lab	London, UK	– Developing European market-specific mobile phone – Developing software used in display products	1994
Russia Lab	Moscow, Russia	– Developing software related to telecommunications – Technology outsourcing	1993
India Lab	Bangalore, India	Developing software related to telecommunication system, home network and printer	1996
Israel Lab	Tel Aviv, Israel	Monitoring technological trends – Developing telecommunications equipments and related software	1997

*Continued*

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US Design Lab	San Francisco, USA	<ul style="list-style-type: none"> <li>– Searching new product concept</li> <li>– Developing product design associated with mobile phone and home multimedia</li> </ul>	2000 reopened
Europe Design Lab	London, UK	<ul style="list-style-type: none"> <li>– Monitoring European product design trends</li> <li>– Doing basic research needed for developing market-specific product design</li> </ul>	2000
Japan Design Lab	Yokohama, Japan	<ul style="list-style-type: none"> <li>– Tracking product design trends of Japanese makers</li> <li>– Developing market-specific product design</li> </ul>	–

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*Source:* Samsung Electronics Company.



Secondly, in 2000 the company reopened the Silicon Valley-based R&D laboratory, which was closed down in 1998. The R&D laboratory was originally established in 1983 to develop semiconductors technology in San Jose, California. The company learnt semiconductors-related technology from this laboratory at the start of entering the semiconductor market. To operate the San Jose-based semiconductors laboratory, the company hired over 30 scientists and engineers with the help of personal networks among US-based Korean scientists.<sup>72</sup> Most of them were ethnic Koreans who had expertise through experiences in the leading US semiconductor companies after gaining PhD degrees in the US. From the beginning, the company did not want to simply learn to imitate semiconductor technology. Rather, the company made great efforts to accumulate and secure an absorptive capacity to develop semiconductor technology by itself.

One of the major reasons is that Samsung's leaders were afraid that some core staff would leave to jobs giving better pay and rewards (Kang, J., 1996). To cope with such a possibility, the company sent 32 young and enthusiastic engineers selected in domestic laboratory to the San Jose semiconductors laboratory to learn beyond simply learning to imitate basic principles and applied technology related to semiconductors.<sup>73</sup> Their training was based on learning by direct investigation, face-to-face instruction and discussions with local staff in the laboratory, and recursive feedback sessions among domestic staff every night for a year. Throughout this course of training, trainees were able to gain a great deal of tacit knowledge embodied in individuals and codified knowledge, such as research notes. These sets of knowledge became the base of absorptive capacity and a source of technological competences. After they returned to the domestic workplace, the company formally established a domestic semiconductor laboratory centred upon engineers trained in the US laboratory. On the basis of technological competences built via these efforts, in 1998 the company became the first

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<sup>72</sup> That is because American scientists and engineers with enough knowledge to develop semiconductors were mostly unwilling to work in a Korean company that was unknown and had no brand power (Kang, J. 1996).

<sup>73</sup> The reason for the company sending 32 engineers was to make 1:1, face-to-face-based learning and investigating possible (*ibid*).

to succeed in mass production of 16Mb DRAM and is now the largest manufacturer of DRAMs and the fourth-largest maker of all kinds of semiconductors. This story gives some important clues for understanding how the company has learned technological knowledge.

According to interviews<sup>74</sup>, although the company still gives priority to the accumulation of core technological competences on a domestic basis, it has been also trying to utilise corporate-wide international technological competences.<sup>75</sup> In this sense, the company has introduced programmes for knowledge exchange and interactive learning between domestic lab-based engineers and foreign lab-based ones. Recently, domestic laboratories have attempted joint activities for knowledge exchange and mutual learning with overseas laboratories, not least US and Japan-based laboratories, which possess technological competences in ICTs, semiconductors and digital technology. Based on this corporate-historical context, the company closed down the San Jose-based semiconductor laboratory after the financial crisis. The company recognised that technological competences of the domestic laboratories were competitive enough to lead the technology. Instead, in 2000 the company established the San Francisco R&D laboratory which is in charge of the development of Digital TV-related technology and US market-specific products. To secure a competitive advantage in the Digital TV technology market, the company strategically formed a multilateral global R&D network, covering central places in technology and markets, including Korea, Japan (Yokohama), Europe (London, UK) and North America (San Francisco) (*Korea Daily Business*, 9 September 1999).

Third, the company opened another US-based laboratory, called the US Product Innovation Lab, in New Jersey in 1998. This laboratory is dedicated to the development of new technologies in digital consumer electronics and

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<sup>74</sup> Interviews with a manager of Telecommunication Division (S-2, 07/10/00), managers of Semiconductor lab (S-5, 20/09/00; S-6, 20/09/00) and an engineer of Telecom Equipment lab (S-8, 21/09/00).

<sup>75</sup> Pavitt and Patel (1999) show that, in general, TNCs tend to domesticate their key R&D activities and competences.

telecommunications and an analysis of local technological trends. Additionally, the laboratory plays an important role in both searching for US high-tech firms to collaborate with and in hiring qualified graduates with Masters or PhD degrees in management and engineering from top-ranked US universities.

Finally, the company opened a Beijing laboratory in late 2000, aiming to develop market-specific mobile phone and telecommunication equipment for capturing an explosively growing Chinese mobile telecommunication market. The current project of the laboratory is to develop mobile telecommunication technology, which is expected to be the Chinese standard. Though the laboratory started with 60 engineers, the company plans to make it a large mobile communication laboratory with more than 300 engineers by 2003.

In short, these responses illustrate that the company, like LGE, has made huge efforts to learn from external sources of technology and knowledge, not only for local adaptation to local-specific markets but also for access to local-specific sources of knowledge and technology. It has been identified that the forms of R&D organisation in the company have been constructed or reconstructed by combining a corporate context and an extra-corporate context. The contexts and factors can be understood in terms of dynamic local and global market situations, technological changes, corporate strategies and competences, and geographical sources of knowledge and competences.

### ***6.8. Inter-firm alliances***

This section attempts to understand the recent move of SEC, like LGE, to make connections with other companies in response to radical change. Before the early 1990s, SEC lacked independent technological capabilities. Major technologies had largely been imported through vertical inter-firm contracts, such as technology licensing, joint ventures and OEM (Original Equipment Manufacturing). Technology licensing

and joint ventures had been an important means for the company to learn and gain advanced technologies and knowledge from leading companies, particularly Japanese counterparts. In addition, OEM contracts with major players had played a crucial role in expanding economies of scale as an indirect way of exporting their products as well as learning know-how and knowledge in a wide range of production and technology. It is not surprising that, in this period of time, it had been difficult for the company to have horizontal cooperative agreements with leading firms, since the company had less competitive resources and competences in technology and markets, with the exception of the advantage of labour costs.

As the company has continued to grow and strengthen its competitiveness since the 1990s, relatively horizontal and cooperative inter-firm agreements have steadily increased in some business sectors, such as semiconductors. Furthermore, increasing competition for market and technology and a global shift towards strategic alliances between major players (Dicken, 1998) made the company seek to take part in such a new business environment. In addition, the company has been gaining international competitiveness since the early 1990s with the help of the success of its semiconductor business. This means that the company was ready to form equal horizontal cooperative relationships with leading players by constructing competitive competences (Kim, 1997).

Table 6.7 shows the major inter-firm alliances between SEC and counterparts since 1998. First, the company has constructed long-term supplier-buyer partnerships with leading companies in the computer industry, such as Dell (1999, 2001), Intel (1999) and Compaq (1999). As mentioned, SEC is one of the top players in semiconductors – notably memory chips – and TFT-LCD. Counterparts want a partner capable of supplying key parts necessary for making their products on a long-term, stable basis. Samsung wants to ensure long-term-based buyers to cope with market turbulence and uncertainty. In addition, Samsung wants buyers to be able to contribute to its facility investment, because capital goods such as semiconductors and TFT-LCD require

continuous and large-scale investment to cope with a shortened product life cycle and a rapidly growing market competition. The most recent agreement between SEC and Dell illustrates this. The president of the semiconductor business division notes:

Dell is very attractive to us because of the proven ability of its model to quickly introduce relevant new technology to the marketplace. First-to-market advantage is critical to our success and Dell knows how to accomplish this by working directly with its customers (SEC's corporate release, 24 March 2001).

In response to this, Dell's co-president notes:

Samsung has consistently provided us with leading-edge technology for the array of products we customise and offer directly to our customers... As we broaden our strategic relationship to also induce R&D activities, we believe we are positioning ourselves to further extend our ability to meet the evolving needs of those customers (*ibid.*).

In fact, since the mid 1990s both companies have maintained a cooperative buyer-supplier relationship. However, the recent agreement shows that both companies are developing reciprocal trust in each other, involving further potential for traded and un-traded interdependencies. Similarly, the company has continued a cooperative relationship with Intel. Both firms have sought interactive learning and exchange of complementary assets, particularly technology.

Forms of alliance such as a long-term partnership may require stronger ties and reciprocal trust between partners than other forms of alliance, such as technological partnerships, because the former immediately affects corporate profitability. However, this is not to argue that market-based forms of inter-firm alliance are better for inter-firm learning than un-traded alliances or that inter-firm networks based on un-traded interdependencies are more sustainable. Although inter-firm alliances are initially based on a market contract, if they build social capital such as reciprocity and trust over time, they are likely to develop collaborative relationships, such as dynamic learning.

Second, there is an increasing tendency for SEC to take part in multi-company collaborative alliance groups, encompassing competitors and non-competing firms, in order to cope with an accelerated trend towards digital convergence. This includes domains of technology such as ICTs, computer, multimedia and semiconductors. The boundary between industries has been blurred, and individual firms do not have all the competences and assets needed for coping with the emerging technologies and markets. It is thus very important for SEC to enter multi-firm alliance 'champion' groups, because one of SEC's core business strategies is to secure its competitiveness via 'digital convergence'.

Table 6.7 Major inter-firm alliances (1998~2000)

Partner	Form	Area	Goals	Date
Intel (US)	Strategic alliance	Digital Still Camera	Joint development of new product	1998
Microsoft (US)	Strategic alliance	PC parts	Technological cooperation on and joint development of PC parts	1998
Toshiba (Japan)	Strategic alliance	VCR	Mutual supply of VCR parts Joint development of key parts	1998
Brooks (US)	Joint venture	Semiconductor equipments	Operating a joint venture firm that produces equipments for semiconductor manufacturing process automation [established in Kiheung, Korea]	1999
Compaq (US)	Strategic alliance	Alpha chip	Long-term supply contract Technological cooperation	1999
Dell (US)	Strategic alliance	TFT-LCD	Samsung → long-term supply of TFT-LCD to DEL DEL → capital investment in SEC	1999
Micron, Intel (US); NEC (Japan), Infineon (Germany), Hyundai (Korea)	Strategic alliance	Next generation DRAM	Joint development of next generation DRAM Sharing and mutual exchange of technological knowledge	2000
Thompson CSF (France)	Joint venture (50:50)	Defence equipments	Combining Samsung's defence equipment production operation and Thompson's technological and marketing capabilities Headquartered in Kumi, Korea	2000
Microsoft (US)	Strategic alliance	Mobile phones	Developing Internet mobile phones Combining SEC's hardware technology and MS's software technology	2000

*Continued*

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Toshiba, Optrex (Japan)	Strategic alliance	LCD chips for electronics appliances	Joint development and marketing of LCD chips Samsung developing chips with a built-in memory Toshiba developing LCD driver IC Optrex producing modules integrating the LCD chips	2000
Intel (US)	Strategic alliance	Rambus DRAM	Samsung → long-term supply of Rambus DRAM to Intel Intel → capital investment in SEC	2001

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*Source:* based on SEC Annual Report (1999, 2000); *Korea Electronics Times*; *Korea Daily Business* (1 January 1998 ~ 30 April 2001).



Another critical reason for the formation of strategic alliances between market and technology leader companies is to dominate global competition for industry standards in the emerging technology, such as digital broadcasting and home network. This 'co-win' strategy between alliance group companies is becoming a vital element for surviving and adapting to a new competition environment. In this sense, the company has continued to seek cooperative relationships with major ICT companies such as Sun Microsystems, Microsoft and Intel. Samsung wants to learn and acquire 'software' technology, while ICT firms want to secure 'hardware' technology.

Third, in a similar context, in June 2000 the company agreed to develop jointly core technologies for the next generation DRAM in association with market-leading competitors, including Hyundai (Korea), Intel, Micron (US), NEC (Japan) and Infineon (Germany). In fact, this type of alliance among technology and market leader firms has often been found in the semiconductor industry. For example, as the required scale of R&D investment in semiconductor production rose, Japanese and US-based firms increasingly formed joint ventures in the 1990s to spread the costs and risks of developing new generations of integrated circuits (Hudson, 2001: 207). They wanted to reduce the uncertainties and risks of R&D. More fundamentally, such an exclusive association between leading memory-chip makers aims at more and more solidifying a monopolistic power of upper-class firms. They want market followers to drop in the market by developing new products in advance.

Fourth, the company has sought to forge cooperative alliances in order to secure the leadership in market and technology by sharing firm-specific technological competences. For example, a strategic partnership with Intel for the development of a digital still camera aims to share Samsung's strength in consumer electronics and semiconductors and Intel's strength in micro-processor chips. Similarly, a strategic alliance with Microsoft to jointly develop PC parts and Internet mobile phones combines Samsung's hardware technology and Microsoft's software technology. In contrast, the partnership between Samsung and Toshiba in the VCR business represents

a coupling between the two strongest links, intending to strengthen their monopolistic positions as top leaders in the saturated market. A strategic alliance with Toshiba and Optrex for the joint development and marketing of LCD chips used in mobile phones may demonstrate inter-firm division of labour using firm-specific competences between partners. Toshiba is in charge of developing LCD driver IC, while Samsung is developing LCD chips with a built-in memory. Optrex produces modules integrating the chips to supply to mobile handset manufacturers. They expect the partnership to help reduce the cost and period of product development as well as to contribute to the mutual sourcing of core parts between partners on a stable basis (*Korea Daily Business*, 7 April 2000).

In sum, since the crisis, strategic alliances by Korean firms such as SEC and LGE have been significantly increased. The 1997 financial crisis had a precipitous impact. Corporate financial difficulties, and the government push to restructure the corporate sector, resulting from the financial crisis, have forced Korean firms to find a more radical breakthrough (Yoo, 2000). Strategic alliances are one of the most favourable ways for them to sustain competitiveness under such pressures. Compared with SEC, LGE has more attempted to forge joint ventures as a means to sell off assets and maintain its competitive position in saturating markets. However, it is expected that Korean firms will focus more and more on horizontal inter-firm agreements with competitors in order to cope with an increasing global competition in technology and markets.

## **6.9. Conclusions**

This chapter has explored the dynamics and processes of how SEC has adapted to radical environmental change. As with LGE, the focus of analysis was on restructuring and learning. There are some implications for adaptation and learning. First, since the crisis the company has tried not only to unlearn obsolete practices and

routines which seemed to constrain organisational renewal, but also to make great efforts for organisational innovation. It should be stressed also that a series of recent radical shocks, such as the crash in memory-chip prices and the financial crisis, have played a role as an external driving force making such changes possible. Such a chain of organisational crises enabled both executives and workers not only to think seriously about what went wrong, but also to have a sense of crisis, which entails recognition of the inevitability of drastic reform. Many agree that such radical changes could be realised because the CEO put radical measures into practice. Together, a 'grafting' strategy has been adopted as a way of sustaining radical adaptation and learning, instead of unlearning old routines. It should be noted that traditional methods of restructuring, such as downsizing, employment adjustment and change in business structure and change in organisational structure, have made it possible for the company not only to unlearn obsolete routines but also sustain discontinuous learning. This is to confirm that, in the face of radical change, corporate adaptation can be realised by a balance between restructuring and learning.

Second, in the process of adaptation, territorial sources of learning have influenced the way in which SEC uses space. The company tends to differentiate competences between corporate spaces. In particular, it has tended to seek a clustering strategy of R&D in the core organisational spaces. This has shown that the reorganisation of production and R&D has critical implications for the context of learning and proximity. The recent tendencies in production activities are characterised by deepened spatial divisions of production and the increase of production shifts to overseas. A central idea in the reorganisation of production is based on the agglomeration into the capital region of high-tech knowledge-intensive industries at the industry level and the geographical integration of core functions at the organisation level. In other words, the company intends to make full use of the territorial advantage of the capital region in terms of infrastructure and knowledge.

Together with this, the company wants to maximise the availability of competences and

knowledge by centralising geographies of core competences in organisation. The company has been trying to build physical and organisational milieu relevant for coping with radical transformations in markets and technologies. In a similar vein, the company has sought to take advantage of proximity in the process of adaptation. The absolute clustering process of R&D illustrates clearly the ways in which the company makes use of proximity. However, it is important to note that this process means the company seeks relational/organisational proximity based on spatial proximity. The company wants to intensify organisational learning capabilities by improving relational/organisational proximity between heterogeneous R&D groups. As a means to do this, the company sought spatial proximity based on a co-location of R&D and production units. The company's concern does not lie in the integration of R&D and manufacturing, but in the geographical integration of R&D units.

In addition to the internal mobilisation of knowledge and modes of intra-firm learning, it is evident that access to external sources of knowledge has been made through the dynamic use of overseas R&D tentacles and inter-firm alliances. This is particularly crucial in the face of increasing environmental turbulence and industry competition. These methods were explained in the context of the firm's knowledge base and competence and the direction of corporate strategy. This implies that firms are not concerned on specialising specific local knowledge, but on promoting organisational knowledge and competences by integrating a variety of knowledge distributed within and without the boundaries of the firm.

Finally, an example of task-force teams has shown that learning communities centred on task-force teams play an important role in sustaining both incremental and radical learning. These communities attempt to sustain learning and innovations by combining tacit knowledge embedded in individuals and teams and codified knowledge. It is difficult to see incremental learning as the acquisition of tacit knowledge and radical learning as the acquisition of formal knowledge. Continuous learning and innovation may need both kinds of knowledge. At the same time, discontinuous

learning and innovation may require to combine tacit knowledge and formal knowledge. Whatever the nature of learning, processes of learning represent the process of bringing together tacit knowledge and codified knowledge.

## Chapter 7

### LGE and SEC compared

#### *7.1. Introduction*

The two previous chapters have examined in detail the complex and multifaceted processes of restructuring and learning and their implications for adaptation (see Table 7.1 for a summary). In this chapter, I compare the two firms studied. The comparison between the two Korean firms is elaborated based on the theoretical framework explored in chapters 2 & 3. Throughout the whole chapter, an emphasis is placed on recognising the context specificity of corporate learning and adaptation.

In the following section, I focus on the effect of traditional methods of restructuring on learning and adaptation. It emphasises that, in the face of radical change, these dimensions of restructuring can be used as a critical device to sustain learning and adaptation. In addition, I argue that both restructuring and learning need to be recognised as on-going corporate responses to radical change in environment. Section 7.3 shows that the processes of organisational change found in case study companies have involved spatialities and such spatialities of organisational change have implications for learning. The firm-specific context leads to different processes and ways of adaptation, particularly in terms of learning, as well as usages of space. This case shows that distinctive spatial forms of organisation result in variations in restructuring and learning strategies.

In the next section, I deal with the way in which both firms have attempted to sustain learning via formal learning channels such as strategic alliances, company training programmes, in-house R&D and grafting. In the final section, I tackle intra-firm social learning through knowledge-brokering communities and its implications for learning

and adaptation. Especially, it centres on the role of task-force teams on radical learning and adaptation.

Table 7-1. Summary of the restructuring and learning by LGE and SEC

	<b>Goals &amp; Adaptation Issues</b>	<b>Restructuring and Learning Practices</b>	<b>Firm Variations</b>	<b>Contexts of Variation</b>
<b>Business structure</b>	To adapt to technology and market competition	Abandoning low profitable & peripheral businesses	<u>Transforming paths</u> LGE: Diversification → downsizing → seeking diversification (merger of LGIC)	Difference in business structure  Learning from trends in the industry
	To strengthen core competencies	→ Downsizing by means of sell-off, spin-off	SEC: diversification but excessive specialisation → downsizing → seeking diversified specialisation	Learning from the past experience (SEC)
	To improve profitability	Instead, focusing more on strategic business areas		Unlearning thanks to flexibilised labour market and the crisis
<b>Employment adjustment</b>	To save labour costs	Increasing R&D employees	LGE: A bit more reluctant to make its employees redundant than SEC	Corporate culture  Learning from the past experience (LGE)
	To capitalise on increased labour market flexibility	Decreasing production employees		
	To facilitate unlearning	Strengthening employees training	SEC: More drastic employment adjustment than LGE	
	To improving organisational knowledge base	Promoting multifunctional workers  Increasing temporary workers	Leading the radical increase of investment and employment in R&D	
<b>Organisational structure</b>	To adapt to a political pressure	Securing independence of individual business divisions	LGE: Production and marketing controlled by individual business division, while strategic planning and R&D by headquarters	Corporate routines and culture
	To respond quickly to radical changes in its environment	Increasing transparency of management practices and the flexibility and speed in decision-making	SEC: Most functions controlled by individual business division	Contrasting geographies of organisational setting

*Continued*

	<b>Goals &amp; Adaptation Issues</b>	<b>Restructuring and Learning Practices</b>	<b>Firm Variations</b>	<b>Contexts of Variation</b>
<b>Production process</b>	<p>To adapt to changes in customer demands</p> <p>To increase manufacturing productivity</p>	<p>Introducing new production methods (A cell production method; A modular production method)</p> <p>Realising the standardisation of parts/components</p>	<p>LGE: Process innovations led by the DAD → other Divisions → overseas plants</p> <p>Best practices in process innovation for consumer electronics</p> <p>More active in the standardisation of parts/components</p> <p>SEC: Not examined in detail.</p> <p>But, best practices in process innovation for semiconductors</p> <p>Unlearning obsolete practices by leadership and the crisis construction</p>	<p>The DAD's historical context (To adapt to standardized product technology, market fluctuation &amp; increasing labour costs)</p> <p>Continuous learning and innovation activities in its own way</p>
<b>Production sites</b>	<p>To adapt to global market change</p> <p>To decrease production costs</p> <p>To penetrate foreign markets</p>	<p>Intensifying spatial divisions of labour</p> <p>Intensifying globalisation of production base</p> <p>(Domestic plants for technologically complex products and high-value products</p> <p>Overseas plants for standardised products and local market-specific products)</p>	<p>LGE: <i>Decentralised concentration strategy</i></p> <p>Reinforcing in-situ restructuring in domestic plants (Making knowledge-intensive plants)</p> <p>While, shifting low-end product production lines to overseas plants</p> <p>SEC: <i>Selective relocation strategy</i></p> <p>Consumer electronics – incremental shift to overseas plants</p> <p>Semiconductors – reinforcing domestic production base (<i>geographical clustering</i>)</p>	<p>Plant-specific knowledge base and competencies in manufacturing</p> <p>Firm-specific production and marketing strategy</p> <p>Product specificity (e.g. semiconductors)</p>

*Continued*



	<b>Goals &amp; Adaptation Issues</b>	<b>Restructuring and Learning Practices</b>	<b>Firm Variations</b>	<b>Contexts of Variation</b>
<b>R&amp;D &amp; Product innovation</b>	<p>To adapt to changes in technology and market</p> <p>To create new product markets</p> <p>To strengthen market position for existing products</p>	<p>More aggressive R&amp;D investments despite the crisis phase</p> <p>Focusing more on developing new technologies for radical innovation</p> <p>Continuing incremental innovations in established technology (diversifying product range &amp; improving product design)</p> <p>Learning by employees training</p> <p>Learning by grafting</p> <p>Learning foreign knowledge from global R&amp;D activities and strategic alliances</p>	<p>Little difference in modes of learning</p> <p>Each firm is investing and concentrating more on its own strengths</p> <p>Each firm tries to make better use of its specific technological advantage (e.g. LGE: digital appliances and digital TVs; SEC: multimedia and semiconductors)</p>	<p>They tend to emulate each other (learning from rivalry)</p> <p>Specificity of technological competencies</p> <p>Difference in corporate strategy and business structure</p>
<b>R&amp;D sites</b>	<p>To improve technological capabilities</p> <p>To penetrate local markets</p> <p>To learn territory-specific knowledge</p>	<p>Intensifying co-location of R&amp;D labs</p> <p>More concentrating domestic R&amp;D sites in Seoul metropolitan area</p> <p>More concentrating core competencies in home base (as hub of in-house R&amp;D activities)</p> <p>Simultaneously, more intensifying globalisation of R&amp;D activities (as complementary sites of in-house R&amp;D activities)</p>	<p><u>Domestic R&amp;D sites</u></p> <p>LGE: Towards spatial division of R&amp;D activities (Seeking dual R&amp;D system)</p> <p>SEC: Seeking extreme co-location of R&amp;D activities</p> <p><u>Overseas R&amp;D sites</u></p> <p>LGE: Continuing globalisation of R&amp;D activities despite the crisis phase</p> <p>SEC: Scale down of some overseas operations after the crisis → Reintensifying overseas R&amp;D activities</p>	<p>Difference in geographical setting of sub-organisations</p> <p>Specificity of strategic business areas (e.g. Home appliances sensitive to specificity of local markets)</p>

## ***7.2. Organisational change as a learning tool***

In this section, based on empirical evidence of two case studies, I speculate on the importance of traditional ways of restructuring as a critical means for firms to learn and adapt to radical change. Prior to exploring this issue, it needs to mention the role of the government in making Korean firms put restructuring in practice as this has played a key role in resulting in similar paths of adaptation between Korean firms since the financial crisis. From the beginnings of national industrialisation, the Korean government, as a 'developmental state', has regulated big business firms as a way of sustaining continuous economic growth (see Amsden, 1989; Chang, 1994; Kang, M., 1996; Kim, 1996; Whitley, 1992). In the midst of the financial crisis, the Korean government, like many other Asian developmental states, attempted to regulate managerial practices and the governance structure of chaebol firms as their survival or competitiveness was strongly linked to the resurgence of the overall national economy (Yeung, 2000b). This involvement is of critical importance in understanding dynamically the process and mechanism of recent adaptation in Korean big firms.

In the wake of the financial crisis, the main point the Korean government made to the largest Korean firms was that they should restructure their operations. As far as the adaptation issue is concerned, the real signal did not come from change in market conditions, but from the political pressure from the government and international organisations. The corporate restructuring programme guided by the government and the IMF required firms to implement the following five tasks: improvement of the corporate governance framework, enhancement of management transparency, elimination of cross-debt guarantees, improvement of the capital structure of firms, and greater concentration in core businesses.

Being the flagship company of each chaebol, both LGE and SEC have been at the heart of the chaebol reform programme. To adapt to extremely uncertain economic conditions, the core issue became that of streamlining operations and making decision-

making more transparent. However, these were not just necessary to meet the government requirements in a short-term. The transformation of both business structure and organisational structure was also critical for both to effectively adapt to increasing market and technology competition in a longer-term. The restructuring of business structure was expected to strengthen core competencies and improve profitability and the restructuring of organisational structure to enable them to respond more quickly to radical changes in its business environment.

In carrying out downsizing, the enactment of new labour laws legitimating labour market flexibility was of crucial importance because this made it possible for both to cut large numbers of jobs. As Beck (1998) argues, the labour market reforms were a vital step to facilitate restructuring which was, prior to 1998, virtually impossible for the chaebol to lay off workers. The majority of jobs cut affected employees in production lines and administrative offices, while the number of R&D employees in both companies has been significantly increased. The link with learning is clear. Both companies believe that employment adjustment has assisted them with unlearning obsolete practices, preconditions necessary for effectively accomplishing new learning practices. But, interestingly, although the pattern and result of employment adjustment are similar, both companies have shown slightly contrasting features in job-cut processes. While SEC drastically pursued job cuts, LGE has shown rather a slower pace. In SEC, the CEO constructed a strong sense of crisis in the organisation and massive job cuts were driven through organisational consensus created by the crisis building, helped by SEC's reputation of not permitting unionisation within the company. Meanwhile, LGE was a bit more careful in implementing job-cut. LGE did not want to repeat the painful experiences of labour disputes in the late 1980s.

In line with massive job cuts, SEC and LGE streamlined business lines, using downsizing to not only transform business portfolio into more lucrative business lines but also to cut many jobs at a time with minimised troubles. However, each company has shown rather different paths in the transformation of its business structure. Until

1996, SEC's profit structure had been excessively dependent on its semiconductors business. However, instability based on cyclical fluctuations in demand of DRAM seriously impacted the company. The company had to redress the imbalance in business lines. SEC tried to use the external shock to redress this imbalance. Downsizing was part of the project to not only lower its debt-equity ratios transform but also transform a mono-centric business portfolio into multi-centric one.

Meanwhile, LGE formed joint ventures with Philips in the display devices – LCDs and CRTs – business which was one of the core business lines, to cope with a saturating and fluctuating global market. As a result, this company has faced a particular dilemma of adaptation. Its business structure resulted in depending too much on saturated business lines – white goods – and on still risky emerging business lines – digital TVs and digital home networks. Thus, this company found it necessary to diversify business lines again in order to cope with unexpected threats in market and technology. Consequently, LGE consolidated LGIC (LG Information & Communication Co.), one of its brother companies in 2000 in spite of criticisms that are concerned about a return to the obsession with economies of scale and the expansion of size.

Finally, both companies have attempted to restructure organisational structure rightly after the crisis. It was critical for both companies to not only adapt to a political pressure to require them to be more transparent and more efficient in the decision-making process but also to be able to respond quickly to radical changes in the business environment. Both companies felt the need to restructure organisational structure after the mid 1990s and tried to transfer partially decision-making authority to sub-organisational units. However, the financial crisis and the government-led corporate restructuring programme played a key role in advancing the decentralisation of decision-making authority. The most significant is that individual business lines begin to take charge of its business lines, while headquarters play a central role to establish company-wide long-term strategies, coordinate sub-organisational units and monitor their performances. Both companies called it 'companies within a company'.

However, there is a contrasting feature between both companies. For LGE, organisational decentralisation is centred on productive activities and the control of some strategic planning function and R&D function remains in corporate headquarters. Meanwhile, SEC decentralised its most functions, ranging from R&D and strategic planning to productive activities. It seems that these consequences reflect differences in existing corporate routines and culture as well as the geographical setting of organisational units.

These restructuring paths illustrate that ways of restructuring could play a critical role as a learning and adaptation device. Facing the need for discontinuous learning in response to radical change, such restructuring practices could become a precondition for firms to sustain continuous adaptation, as discontinuous learning requires to unlearn obsolete routines.

### ***7.3. Spatialities of organisational change and learning***

One of my findings drawn from evidence of empirical study is that the processes of organisational change found in both companies have involved spatialities and such spatialities of organisational change have implications for learning. As multi-divisional firms as well as multinationals, both companies appear to have decentralised forms of organisation on both a national and a global scale. This means that these firms may face a need of effectively managing decentralised competences within and without boundaries of the firm.

Both companies have displayed some interesting geographical implications in the restructuring of production activities. They have not shown dramatic features such as a factory closure in the process of production restructuring. Instead, they have focused more on in-situ restructuring through the partial shifts of production lines. They have been more and more intensifying international divisions of labour in productive

activities. Since the crisis, both companies, basically, have tended to promote domestic plants as a focal site of global production networks. Thus, domestic plants have been focused more and more on producing more technologically complex and high value products, while existing production lines centred on standardised consumer electronics products have increasingly been being shifted to overseas subsidiary plants.

There have also been found some distinctive features in geographies of the restructuring of production activities between the two. LGE has taken a decentralised concentration strategy. On the one hand, this means that production activities have been increasingly globalised, while production activities of strategic core products such as digital electronics products have remained in domestic focal plants. On the other hand, this strategy can be expressed as the selective globalisation of production activities. However, the company plans to shift even such high-tech products to overseas if overseas plants based in China and South East Asian countries establish knowledge base enough to produce high-tech products.

Meanwhile, SEC has taken a selective relocation strategy. This company has been incrementally shifting some of consumer electronics business lines – for example VCRs – to overseas subsidiaries in South East Asian countries. However, this company has been more reinforcing an expansion of semiconductors production facilities in domestic production sites around Kiheung, the world's largest semiconductors production complex, with the exception of foreign investments to penetrate trade barriers. The reason for this is that the company sees the domestic semiconductors plants as best performance plants that possess a great deal of tacit knowledge which may be difficult to be transferred to outside of the home base.

Moving on, both companies have also used geography for learning in R&D. The most significant is that both companies have sought the globalisation of their in-house R&D activities. It is important for them to improve overall technological capabilities and harness and learn territory-specific information and knowledge. But this also has

become increasingly important to penetrate foreign markets. However, in spite of the increasing globalisation of R&D activities, R&D sites at home base have remain as a hub of global R&D networks. Both companies have concentrated core competencies in the home base. Thus, many of foreign R&D centres function as a complementary site rather than replacing home base R&D functions. However, both companies have shown more or less distinctive responses to globalisation of R&D activities. LGE decided to continue investments to maintain and expand its global R&D networks despite the crisis phase. LGE needed to continue and expand foreign R&D activities because its main profit sources come from consumer electronics products which are more sensitive to specificities of foreign local markets. Meanwhile, SEC decided to close some overseas operations immediately after occurring the crisis. This company, however, has begun to re-intensify investments in foreign R&D activities after the financial turmoil situation became calm down. The partial reason is that SEC believed that remaining R&D functions are capable of replacing or complementing R&D functions carried out by foreign R&D laboratories closed down.

As opposed to LGE, SEC has concentrated more on a co-location of R&D functions in Suwon and its surrounding areas, belonging to Seoul metropolitan region. As most of its plants have been clustered in Suwon and its surrounding areas from the beginning, R&D has been easy to interact with manufacturing. This company has again attempted to move remaining R&D laboratories, which are scattered around Seoul owing to insufficiency of spaces in its Suwon industrial complex, into Suwon as some production lines have shifted into overseas subsidiaries. It can be said that this company seek an extreme co-location strategy.

Considering the above, the reason why both companies have revealed differences in spatial processes of organisational change in production and R&D is related to the fact that both companies have different spatial forms of organisation. The corporate use of place-bound resources is associated with capabilities to have access to and learn both informal and formal sources of knowledge. Firms characterised by decentralised

forms of organisation may try to use space and place in the course of adaptation and learning, because individual spaces and places represent distinctive potential for learning and innovation. In this sense, it appears that each company has tried to improve the potential for learning through reorganising and reconfiguring a given form of organisation. The feature of both companies as spatially decentralised manufacturing firms in both domestic and global scale gives a critical implication for organisational and technological learning in the domain of R&D as well as between R&D and manufacturing.

Although both companies display decentralised spaces of organisation in the domestic level, the actual characteristics of the space of governance are distinct. Samsung shows an absolute concentration of core functions and units, whilst LG presents spatial separation among organisational units and business divisions. In the course of seeking radical adaptation, Samsung has tended to deepen clustering of almost all core activities such as R&D and managerial functions and core manufacturing plants. It has tried to maximise efficiency of coordination between different units of organisation and the potential for interactive organisational learning between different R&D teams and between R&D, manufacturing and other managerial functions via close physical proximity and an increased potential of organisational proximity.

Meanwhile, in LG, the spatially dispersed multi-divisional form of organisation challenges the mobilisation of distributed knowledge and competence. Core in-house R&D laboratories are distant from sites of focal manufacturing plants, which each site belongs to an independent business unit. In line with this, in-house R&D laboratories are dispersed by business unit and between central laboratories and product-specific local laboratories. The challenges are to improve the potential of localised learning as well as simultaneously to continue to manage an effectiveness of interaction, communication and learning between R&D and manufacturing. To do this, core R&D activities continue to move to the corporate R&D complex in Seoul, whilst R&D activities necessary for close linkage to manufacturing activities remain in focal



manufacturing plants. The former is not only to have access to sources of knowledge and competence embedded in the capital region but also to promote effectiveness of interactive learning between different R&D teams and units, based on the increased potential of organisational proximity through the spatial clustering of core R&D activities. In contrast, the latter is to maintain or improve an ability to mobilise and learn distributed sources of knowledge within the whole organisation via organisational proximity based on the spatial and functional integration between R&D and manufacturing.

It is common that both companies continue to concentrate more and more their (core) R&D competences in the capital region around Seoul. Upper-tier cities, notably globalised metropolitan areas, have advantage of knowledge because they contain rich sources of knowledge that constitute constellations of a variety of codified and tacit forms of knowledge, on the basis of diversity and intensity of networks (Amin and Thrift, 2001). Without doubt, in Korea the capital region offers a superior potential for allowing firms in need of multiple sources of knowledge to have access to formal sources of learning such as producer service firms, top-class universities and public & private research institutions as well as informal sources of learning such as a superior chance of easy and frequent-contact to scientific communities and intelligent brain pools.<sup>76</sup> In addition to this, both companies are concerned about the ways in which the spatial decentralisation of R&D activities gives rise to the difficulty in maintaining and mobilising the sources of intellectual knowledge in R&D. This concern is evident in Blanc and Sierra (1999) arguing that the decentralisation of R&D activities entails a risk of capability fragmentation.

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<sup>76</sup> See for example Park and Nahm (1998) on the increasing concentration of managerial and control functions and producer service firms into the capital region.

#### ***7.4. Formal learning in adaptation***

As explored in case study chapters, both companies have attempted to innovate processes and products as a means to cope with increasing global competition in technology and markets. For manufacturing firms, the centrality of technological learning may lie in effectively sustaining both incremental and radical innovation in process and product: an incremental innovation as the refinement and improvement of existing processes and a radical innovation as the development of new processes or products which requires different routines from the old ones.

Before and after the financial crisis, LGE has attempted to set up new production methods to build up a flexible mass production system. However, it was to complement mass production rather than replacing it. Although I could not explore process innovations in SEC in detail, I have found some clear evidence from secondary data and interviews that SEC has also made great efforts to sustain innovations in process (e.g. inventory cost-saving). The economic crisis has resulted in a radical decrease in demand in both domestic and global markets. Therefore, both companies have had to make more effort to sustain process innovations in order to save costs and improve productivity.

These process innovations have been possible because both companies have been prepared to innovate production processes and draw on codified and tacit forms of knowledge to sustain such process innovations. Especially, this was evident in an example of LGE. The company have accumulated knowledge, necessary for process innovation, in the form of skills, know-how as well as codified knowledge as the result of experiences, experiments and trial and errors for a long time. Such knowledge has become a basis for absorptive capacity which makes process innovations possible. This case indicates that innovation cannot occur without knowledge bases accumulated within the firm and learning processes are context-specific as well as firm-specific. This argument would become much clear by considering the following case.

LGE has paid more attention to the standardisation of parts/components than other domestic rivals, in order to lead process innovations in production lines for consumer electronics. Among other things, the DAD (the Digital Appliance Business Division) has played a leading role as a source of knowledge and innovation, as far as production activities are concerned. The reason is that this business division has been dedicated to the production of technologically standardised white goods, which represent relatively a low entry barrier in its industry. To adapt to such pressures as market fluctuation, increasing competition and an increase in labour costs, this business division thus must have focused more on both improving productivity and saving production costs than other business lines. In addition, according to interviews, this business division, compared to other business divisions, has traditionally been known as distinctive organisational culture with strong organisational identity and consensus. It is said that such an organisational proximity has made much contribution to leading process innovations.

An example of process innovations by LGE gives some critical implications for the theory of learning. First, process innovation is characterised by complex learning processes in which a variety of people and organisational units are involved. Second, such learning involves the processes of bringing together tacit knowledge and codified knowledge. Finally, assets of knowledge established as a result of evolutionary learning can be a critical source of knowledge for radical learning and innovation.

Together with process innovation, product innovation is also an important element of technological learning. Both firms have made great effort to both continue product innovations and strengthen technological competences in order to cope with an increasing market competition. They tended to slightly reduce investments in R&D during 1998 after the financial crisis. Thereafter, however, both companies, in spite of facing a severe economic downturn, increased investments in R&D. There are some reasons for this. Firstly, Korean firms expected that the Asian crisis would not last

long. Secondly, and more importantly, they thought that the only way to overcome economic depress was to create new market niches through continuous technological development and product innovation. Thirdly, they were anxious not to lose their competitive positions in a cutthroat competition for emerging digital electronics markets between global leading electronics firms.

Therefore, they have been focusing on developing new technologies and products for radical innovation. At the same time, they have been striving to continue incremental innovations in established technology through diversifying product range and improving product design. To sustain this goal, both companies have tried to raise organisational and technological competencies by using a formal means of learning. First, a radical increase of inter-firm alliances has been the most significant feature. Both firms have aimed to not only learn technological knowledge existing in diverse forms from alliance partners and share it with them, but also cope with instability and unpredictability in market and technology by cooperating with industry leaders. Second, both companies have focused more on employees training. For this, they have attempted to not only activate off-the-job-training such as the operation of a corporate university and MBA courses and the support of employees studying inside and outside of the country but also to promote on-the-job-training. Third, both companies have attempted to improve competencies, instil new insights and ideas and unlearn obsolete practices and routines by recruiting well-educated doctoral graduates studying overseas and industry veterans who have worked in leading foreign firms.

Although there is little difference in formal learning practices between the two, some differences can be noted. In fact, SEC has been known as a Korean company taking best advantage of 'learning by grafting' and employee training. The domestic rival firms, including LGE, have tended to learn and emulate from SEC. However, this is not to say that LGE always follows SEC. In recent years, each has attempted to make better use of its specific technological advantage and strengthen core competencies. For example, LGE has focused more on digital appliances and digital TVs, while SEC

has focused more on multimedia and semiconductors. Each company's technological learning practices reflect such a tendency.

In sum, these formal learning methods include strategic alliances, in-house R&D activities, employee training and grafting. Methods of learning such as strategic alliances, the search of foreign knowledge through foreign R&D activities and grafting provide firms with a good opportunity to access and learn valuable information and knowledge, while those such as in-house R&D and a variety of employee training programmes can play a role in improving organisational knowledge and competences further, generating new knowledge and disseminating such knowledge within the firm. Finally, and most importantly, these means of learning can be crucial to sustain radical learning and innovation such as the development of new processes or new products as radical learning, in many ways, necessitates new knowledge or knowledge outside the firm as well as different way of doing things.

### ***7.5. Social learning in adaptation***

There is no doubt that formal learning channels, like those described in the above section, are important for firms to learn and adapt in a radically changing environment. It is hard to see, however, that they are a sufficient condition to sustain learning and adaptation. In this sense, an understanding of social learning taking place informally within and beyond the firm gives critical insights into unveiling actual learning processes as well as the sources of learning.

In my case studies I could not fully clarify the detailed processes of social learning. In addition, it would not be possible to statistically measure the extent to which communities of practice contribute to creating knowledge and sustaining learning. Nevertheless, case study firms have shown clear evidence to represent the importance and role of social learning in sustaining learning and adaptation. Especially, the study

of LGE shows that some radical innovations have been achieved as a result of in-depth communications and frequent interactions between workers. Both companies are characterised by hierarchical organisational cultures and a lack of slack and these cultural and institutional characteristics appear to restrict the possibilities that communities of practice are activated.

To overcome such limitations to learning, in recent years, both companies have tried to facilitate non-formal social learning as a means to encourage learning-oriented organisational cultures between peers, and between boundaries of sub-organisations as well as to sustain both incremental and radical learning and innovation. It is a good example that LGE has made efforts to create and facilitate knowledge-brokering epistemic communities not only to encourage the creation and sharing of knowledge but also to solve in informal way the emerging problems facing the firm in the long-term. More than anything else, it is most significant that both companies have attempted to take full advantage of task-force teams, aiming to sustain both incremental and radical learning as well as to solve a certain problem.

In LGE, task-force teams are either spontaneous or strategic. While self-organising spontaneous task-force teams tend to contribute to incremental innovations, strategic task-force activities are expected to sustain radical innovations. Recently, the company has strived to support task-force activities that communities of practice organise spontaneously. Compared to LGE, it is noteworthy that SEC operates a purpose-specific physical space, called the VIP Centre, designed to promote an efficiency of task-force activities as well as communications and interactions between task-force teams. In sum, these examples represent that learning communities play a critical role in sustaining both incremental and radical learning and adaptation. In this sense, to understand firm learning and adaptation, we need to consider the processes and mechanisms of social learning occurring within and beyond the firm.

## ***7.6. Conclusions***

This chapter has presented the comparative accounts of the main findings on the pathways to Korean firms' learning and adaptation in the face of radical change. In recent years, the centrality of an interpretation of corporate adaptation and success has radically moved from the restructuring-based approach towards the learning-based one. There is no doubt that competence and learning-based approaches offer critical new insights into an understanding of the processes and variations of adaptation and evolution. However, the evidence drawn from an empirical study on Korean firms represents that an interpretation of corporate adaptation needs to speculate more on the processes of corporate restructuring. To adapt to radically changing environment, firms are necessary to focus not only on sustaining radical learning but also on seeking on-going restructuring. It should not regard ways of restructuring based on organisational change as merely a reactive means of adaptation. Instead, organisational change can be important as a learning tool. This interpretation illustrates that continuous adaptation and evolution is likely to depend on a firm's capability to effectively sustain restructuring and learning by monitoring changes in internal and external environment.

Second, for empirical research, firms create and reorganise their own organisational spaces. Multilocal and multinational firms that have the decentralised geographical forms of organisation need to strive to mobilise distributed knowledge and competences within and beyond boundaries of the firm. The shifts of production and the globalisation of R&D activities reflect the local-specific sources of knowledge and competences. Korean firms have chosen a strategy of co-locating R&D units in a certain geographical area as a means to promote relational/organisational proximity which is seen to influence a learning capability. In the context of learning, another important aim is to access to places that are replete with valuable information and knowledge and thereby to make good use of a place-specific advantage.

Finally, corporate learning channels are diverse. Formal learning channels include inter-firm alliances, company training programmes and ‘grafting’. These are of critical importance in not only learning knowledge outside the firm but also in improving knowledge and competences within the firm. On the other hand, as explained earlier, learning based on knowledge-brokering communities can be a driving force of both incremental and radical innovations. Korean firms are expected to focus more on sustaining both incremental and radical learning in order to adapt to rapidly changing environment by taking advantage of formal as well as informal methods of learning.



## Chapter 8

### Conclusions

#### *8.1. Introduction*

In the wake of the Korean crisis, most Koreans and foreign observers raised a question. Will Korean chaebol, or big firms, survive? The question I have raised, following institutional and evolutionary perspectives, is how they have responded to radical environmental changes since the financial crisis? It would be difficult to say that evidence from two Korean firms represents a general perspective on radical learning. However, my research on two of Korea's flagship companies provides some valuable insights into theoretical questions concerning learning and adaptation.

First, corporate adaptation involves firm-specific and complex organisational processes. This implies that deterministic and totalising explanatory frameworks cannot specify how adaptation might be realised within firm-specific and wider socio-institutional contexts. The paths of corporate responses to a certain environment cannot be explained as logically elaborated in textbooks or a certain theoretical position. The case study has shown that the paths and mechanisms of corporate responses to adapt to the crisis have been influenced by context-specific factors.

Processes of corporate adaptation have been realised through restructuring and learning practices of various forms. These include not only non-learning-based restructuring methods such as changes in business structure, organisational structure and employment but also various non-technological and technological learning practices. A theoretical implication is that the evolutionary and competence-based approach to the firm has tended to focus too much on learning as a factor that influences corporate evolution and adaptation. The empirical research has shown that traditional restructuring methods

have been of paramount importance for both short-term and longer-term adaptation – even more critical for longer-term adaptation. Traditional restructuring performances have influenced effectiveness of other forms of learning practices. Downsizing and change of business structure offered Korean firms a basis for sustaining new learning and innovations in product and process. Thus, an understanding of corporate adaptation needs to incorporate heterodox positions such as a learning perspective, a restructuring perspective, innovation system studies, business system research and a political economy perspective.

In the following section, I argue that the paths and outcomes of corporate adaptation may vary according to specificity of organisational contexts. In section 8.3, I challenge fashionable perspectives on theories of the firm and geographies of learning, which tend to fetishise learning in explaining continuous adaptation and long-term evolution. Instead, I suggest that restructuring is also an indispensable process for continuous adaptation in the radical context and argue that both learning and restructuring should be integrated in a common perspective. In section 8.4, I claim that a learning perspective needs to consider all forms of knowledge and learning in understanding complex dimensions of learning. The last section deals with the role of proximity in sustaining learning and stresses that learning in the firm occurs on the basis of the dialectic relation between spatial and relational/organisational proximity.

## ***8.2. Specificity of organisational context and adaptation***

Organisational processes for adaptation and paths to adaptation are likely to present firm-specific characteristics. Thus, firm-specific contexts lead to distinctiveness in adaptation and evolution between firms with similar industry and institutional contexts. There are a variety of factors that make corporate adaptation context-specific. Those include the firm's evolutionary trajectory and path-dependence, leadership, business strategy, characteristics of organisational knowledge and competences and the (spatial)

forms of organisation.

Each firm has shown distinctive aspects of adaptation. Although LGE and SEC, as part of Korean chaebol firms, share common attributes of the national business system, both have different evolutionary trajectories. In more detail, they illustrate difference in organisational routines, leadership, business structure, (core) competences, organisational structure, and its spatial form.<sup>77</sup>

The example of Samsung shows the importance of leadership in breaking path-dependence and seeking new ways of adaptation. The difference in the characteristics of business structure between firms leads to different ways of adaptation strategies. This aspect is critical to understand firm-specific pathways to adaptation through different strategies and ways of restructuring and (technological) learning. Organisational structure and its spatial form influence the effectiveness of decision-making and learning as well as the firm-specific ways of mobilising sets of knowledge distributed in organisation. However, it is clear that the nature and characteristics of knowledge and (core) competences embedded in individual firms become a key factor that leads to distinctive processes and ways of adaptation and learning. Consequently, these dimensions imply that processes and mechanisms of adaptation should be understood by considering multiple organisational variables that exist in an individual firm.

### ***8.3. Indivisibility of restructuring and learning***

Much of the recent literature on organisational change, innovation and competitiveness tends to claim that organisational learning and knowledge accumulation is the single

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<sup>77</sup> Some scholars, such as Kotter and Heskett (1992), Hodgson (1999), Schein (1992), and Schoenberger (1997), attempt to understand such differences from the context of corporate culture. As an approach to corporate culture, however, may need un-packing of the firm based on longitudinal and in-depth survey, it frequently find it difficult to know that.

pathway to long-term corporate success and competitiveness. This thinking should be reconsidered. First, organisational changes and processes of adaptation are not discontinuous or simple processes, but on-going. Second, corporate responses to environmental change are influenced by both internal inertia and resistances and external challenges. In a relatively stable environment, the evolution of the firm might be sustained by existing ways of doing things and routine learning. But, to survive and evolve in a radical context, firms are required to draw on more complex responses.

In Korea's largest electronics firms, corporate restructuring has been an essential part of the response to adapt in the face of the crisis. The traditional ways of corporate restructuring involving downsizing and streamlining seem to be crucial for short-term recovery as well as long-term evolution. Restructuring is not only a precondition to recover a reliable corporate financial structure, but it becomes a foundational element that makes 'learning to adapt' possible. In spite of the long-felt need for restructuring, both companies had not tried to do so until the economic crisis. In part, this was due to organisational lock-in and inertia. However, external pressures such as the financial crisis and the government push to lead corporate restructuring ignited restructuring.

This implies that ways of restructuring that are generally assumed as a corporate strategy centred upon saving costs should not be simply read as pathways to weak competition. Processes of restructuring centred on business downsizing and redundancies have provided firms with a chance to learn radically to adapt as well as to improve core competences. In other words, the Korean evidence shows that routine-breaking learning can be more effective when corporate restructuring is pursued coherently on the basis of the strategic orientation of the firm.

Therefore, I argue that both restructuring and learning should be treated as indivisible requirements for continuous adaptation and the long-term survival of the firm. In this sense, the recent literature that accentuates simply learning as a key process for successful organisational evolution is partial. The evolutionary dynamics of firms

involve complex organisational processes and mechanisms that bring together learning and restructuring. In this sense, firms need to continue restructuring and learning practices in a continual basis in order to adapt to instability and unpredictability in market and technology. The balanced combination of restructuring and learning practices enables the firm to improve its adaptability on both short-term and longer-term bases. If a firm focuses on simply the improvement of learning capability without carrying out restructuring in a relevant way, it could be caught in a competence trap. Conversely, if a firm focuses on simply implementing restructuring programmes with a lack of learning practices, it could be also difficult to gain competitiveness. These both aspects are important for corporate adaptation and continuous evolution, because, as argued by Amin and Cohendet (1999), more crucial is to learn to adapt rather than learning to learn.

#### ***8.4. Indivisibility of incremental and radical learning***

The result of the empirical studies shows that large firms seek to sustain adaptation through complex ways of learning using multiple forms of knowledge and across multiple organisational spaces. It challenges the existing view stressing powers of (local) tacit knowledge and incremental learning in sustaining competitive advantage under environmental uncertainty (e.g. Maskell and Malmberg, 1999a, 1999b).

The issue here is about the relationship between knowledge and learning. In reality, the nature of learning that takes place in a firm is closely associated with the nature of competition in the industry and the characteristics of the business environment. In a relatively stable environment, firms may secure competitive survival through incremental improvements in product and process. This implies the promotion of tacit knowledge such as skills and know-how based mostly on learning-by-doing. However, in a complex and unpredictable business environment, dependence on only incremental learning would make a firm's survival difficult to assure. Thus, in the context of

radical change, firms need to develop more strategic and dynamic learning.

In my study, both companies seek to adapt to radical environmental shifts via strategic ways of learning such as in-house R&D activities and inter-firm alliances as well as the facilitation of informal and formal learning within the organisation. Rapid technological changes and accelerated technological competition have forced the company to mobilise internal sources of knowledge and competence as well as to link to external sources of knowledge, to improve technological knowledge and capabilities. In the course of pursuing learning, it is clear that some knowledge and routines hindered continuous adaptation. However, this is not to imply that strategic learning must replace the existing base of knowledge and routines with a new knowledge base. Established knowledge and routines have played a critical role in sustaining strategic learning. In this sense, an argument that assumes a strict dichotomy between codified and tacit knowledge as well as between the established base of knowledge and new one does not help to understand complex ways of learning undertaken by the firm in the face of radical change.<sup>78</sup> As argued by Allen (2002), innovation and learning are not just about the formalisation of previously unstated ways of doing things, but also involve an interplay between tacit and codified knowledge as well as a combination between established knowledge and new knowledge.

In addition, corporate learning can occur through not only strategically designed learning communities such as epistemic communities and task-force teams but also through unconscious learning between workers and between people across the boundary of the firm. These sorts of learning in the firm can play a vital role in sustaining both incremental and radical learning. In the case of Korean firms, the task force (or project) teams which can be viewed as a strategically designed, purpose-specific, learning group make a critical contribution to leading organisational and technological innovations. The task force teams tend to be organised for taking advantage of the benefits of spatial and organisational proximities. Learning in the task force team can

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<sup>78</sup> See for example Allen (2000), Amin and Cohendet (1999b), Asheim (1999) and Howells (2000) for arguing the inseparability between codified and tacit knowledge.

be effective as creating '*ba*', a context in which knowledge is shared, created and utilised via intensive interactions between project team members (Nonaka and Konno, 1998; Nonaka, Toyama and Konno, 2001). These team members who possess distinctive expertise and skills are assembled from within and without the firm. They also undertake their projects through co-location as well as across places (Grabher, 2002; Bengtsson and Soderholm, 2002). The nature of their activities presents networks of relations through relational/organisational proximity beyond bounded places. As a result, this kind of organisational form may to a greater or lesser extent function as a boundary spanning learning object.

Finally, it should be noted that, in both firms, 'grafting' has been adopted as a critical way to learn new knowledge, mostly tacit knowledge embodied in individuals as well as to sustain radical adaptation through discontinuous learning. Although both firms have strived to make good use of 'grafting' so far, Samsung tends to utilise it more dynamically and widely, in order to access external sources of knowledge as well as to unlearn obsolete routines required for discontinuous learning. The fact that the corporate leader and some of top executives were replaced by managers who have new perspectives has become an effective means to seek routine-breaking adaptation. In addition, the recruitment of highly qualified scientists, engineers and graduates from advanced countries, particularly the US, has played a positive role in absorbing valuable tacit knowledge which may be not easy to acquire just through weak ties of networks between firms. Such recruitment has also helped new ideas and knowledge over the whole organisation.

The arguments above confirm that it is not easy to identify the boundary between incremental and radical learning. Radical learning requires access to formal knowledge. However, radical learning also needs tacit knowledge, by combining formal knowledge with the tacit knowledge that certain individuals and organisation possess (Howells, 2000; 2002). In addition, the conventional view that the radical learning requires losing assets of incremental learning needs to recognise that radical

learning can be sustained more effectively by utilising assets of incremental learning.

In sum, firms need to make efforts to sustain not only incremental learning and innovation but also radical learning and innovation. Incremental learning and innovation could be important for firms to maintain a competitive position for a given market on a short-term basis. However, adaptation requires firms to do more than this. In this sense, radical learning and innovation could be crucial for firms to gain its competitive position for an emerging industry competition on a longer-term basis. In doing this, firms need to strive to learn competitive knowledge through various learning practices in order to build up organisational and technological competences.

### ***8.5. The role of proximity in firm learning***

This section deals with how proximity influences adaptation in a broad sense and learning in a narrow sense. The concept of proximity is defined here as closeness between agents within the web of complex human relationships. Proximity thus implies multi-dimensional aspects that define the nature of the relationship between agents. Particularly, dimensions of proximity, spatial and relational/organisational, are all important to explain the role of proximity in learning. As discussed in Chapter 3, proximity is crucial not only to understand adaptation strategies in response to radical changes of the business environment, but also how processes and mechanisms of learning occur in the firm.

Many economic geographers have argued as we saw in Chapter 3 that the effectiveness of learning in the firm is based on advantage of geographical proximity between agents. Most recently, some commentators, such as Amin (2000) and Rallet and Torre (1999), have suggested that geographical proximity may not be the fundamental aspect and that the issues of proximity should be understood in terms of relational/organisational proximity between agents involved in learning processes. My evidence suggests that



both geographical proximity and organisational proximity need to be grasped to understand the role of proximity in sustaining adaptation and learning, rather than arguing the superiority of any single side.

Firms try to promote innovativeness and the capability to learn by building relational/organisational proximity. Spatial proximity would be viewed as a means of sustaining this. The basic condition to increase relational/organisational proximity between organisational members is to make an organisational environment that supports frequent, intensive interaction and communication on a face-to-face basis. Leonard and Swap (1999) who illustrate best the rationale put it:

All the technology in the world does not – at least yet, and maybe never – replace face-to-face contact when it comes to brainstorming, inspiring passion, or enabling many kinds of serendipitous discovery. *A study of geographically dispersed product development has found that team members conducting complex tasks always would have preferred to have a “richer” medium (that is, one supporting more channels and more interaction) than they actually had to use. Fax is fine for one-way communication; e-mail for two-way, asynchronous and relatively emotionless communication; telephone for communications that require no visual aids; and video conferencing if no subtlety in body language is necessary. But face-to-face communication is the richest multi-channel medium because it enables use of all the senses, is interactive and immediate* (p. 160; cited in Thrift, 2000, my emphasis).

Samsung, which pursues the extreme co-location of core functions centred around R&D and operates an exclusive organisational space to undertake task force projects, shows how firms try to use spatio-organisational proximity to facilitate learning as a kind of adaptation strategy. In addition, examples that show processes of organisational learning centred on R&D teams in LG and learning through task force activities in both companies prove that frequent, intensive face-to-face communication is fundamentally crucial to sustain learning, notably radical one.

Geographical proximity can be a useful means for gaining “rich” organisational proximity which means it could be a better way of understanding, making a sense,

learning one another in both mutual and recursive ways. This in turn implies, however, that organisational proximity increased through the repetition of these processes can be to a degree sustained at a distance with the help of ICT communication methods such as e-mail, telephone and teleconferencing. Consequently, simply 'being there' is half-sided.

In addition to this, examples of distanced learning, such as the increasing globalisation of R&D activities, business travels and the cooperative relationships between distanced firms, tell us that learning does not necessarily need geographical proximity and need not necessarily be dependent upon localised learning. Corporate learning takes place through networks of relationships across organisational spaces on a global basis. All this is to emphasise the centrality of relational dimensions in the way in which learning takes place and is realised.

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## **Appendix I Key Informants Interviewed**

### **1. Corporate Managers**

- L-1, Manager, Management Team, DDD, LGE (23/07/00).
  - L-2, Manager, Management Team, DAD, LGE (14/07/00).
  - L-3, Manager, Management Team, DAD, LGE (20/07/00).
  - L-4, Team leader, Super A Team, DDD, LGE (22/07/00; 12/08/00)
  - L-5, Manager, Production Engineering Team, LGE (30/08/00).
  - L-6, Manager, Manufacturing Team, TV plant, LGE (31/08/00).
  - L-7, Supervisor, Manufacturing Team, DDD, LGE (29/08/00).
  - L-8, Senior Manager, Manufacturing Team, TV plant, LGE (29/08/00).
  - L-9, General Manager, New Display Product Lab., DDD, LGE (06/08/00).
  - L-10, Manager, Development Support Team (R&D), LGE (19/08/00; 03/09/00).
  - L-11, Chief engineer, DND Engineering Dept., LGE (26/07/00).
  - L-12, Manager, Digital Network Division, LGE (25/08/00).
  - L-13, Senior engineer, New Display Product Lab., LGE (01/08/00).
  - L-14, Senior engineer, Digital TV Lab., LGE (11/08/00).
  - L-15, Manager, DND Super A Team, LGE (26/07/00; 22/08/00).
  - L-16, Senior engineer, DND Engineering Dept., LGE (11/08/00).
  - L-17, Engineer, Digital TV Lab., LGE (06/07/00; 10/09/00).
  - L-18, Engineer, DND Engineering Dept., LGE (01/09/00).
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- S-1, Manager, Management Team, Consumer Electronics Division, SEC (30/09/00)
  - S-2, Manager, Management Team, Telecommunication Division, SEC (07/10/00).
  - S-3, Manager, Manufacturing Team, Telecom equipment plant, SEC (22/09/00).
  - S-4, Manager, Manufacturing Team, TV plant, SEC (23/09/00).
  - S-5, Manager, Semiconductor Lab., SEC (20/09/00).
  - S-6, Manager, Semiconductor Lab., SEC (20/09/00).

S-7, Manager, Semiconductor Lab., SEC (21/09/00).

S-8, Engineer, Telecommunication Equipment Lab., SEC (21/09/00; 14/10/00).

S-9, Engineer, Digital TV Lab., SEC (08/09/00).

## 2. Industry Experts

K. Moon, Professor, Management, Kyungpook National University (07/09/00).

Y. Huh, Professor, Electronics, Kyungpook National University (29/06/00).

J. Lee, Director, Taegu Techno Park (28/06/00).

C. Lee, Professor, Economic Geography, Kyungpook National University (27/06/00).

G. Kwak, Director, Kumi Chamber of Commerce (05/07/00).

T. Kim, Civil servant, Changwon City council (20/07/00).

